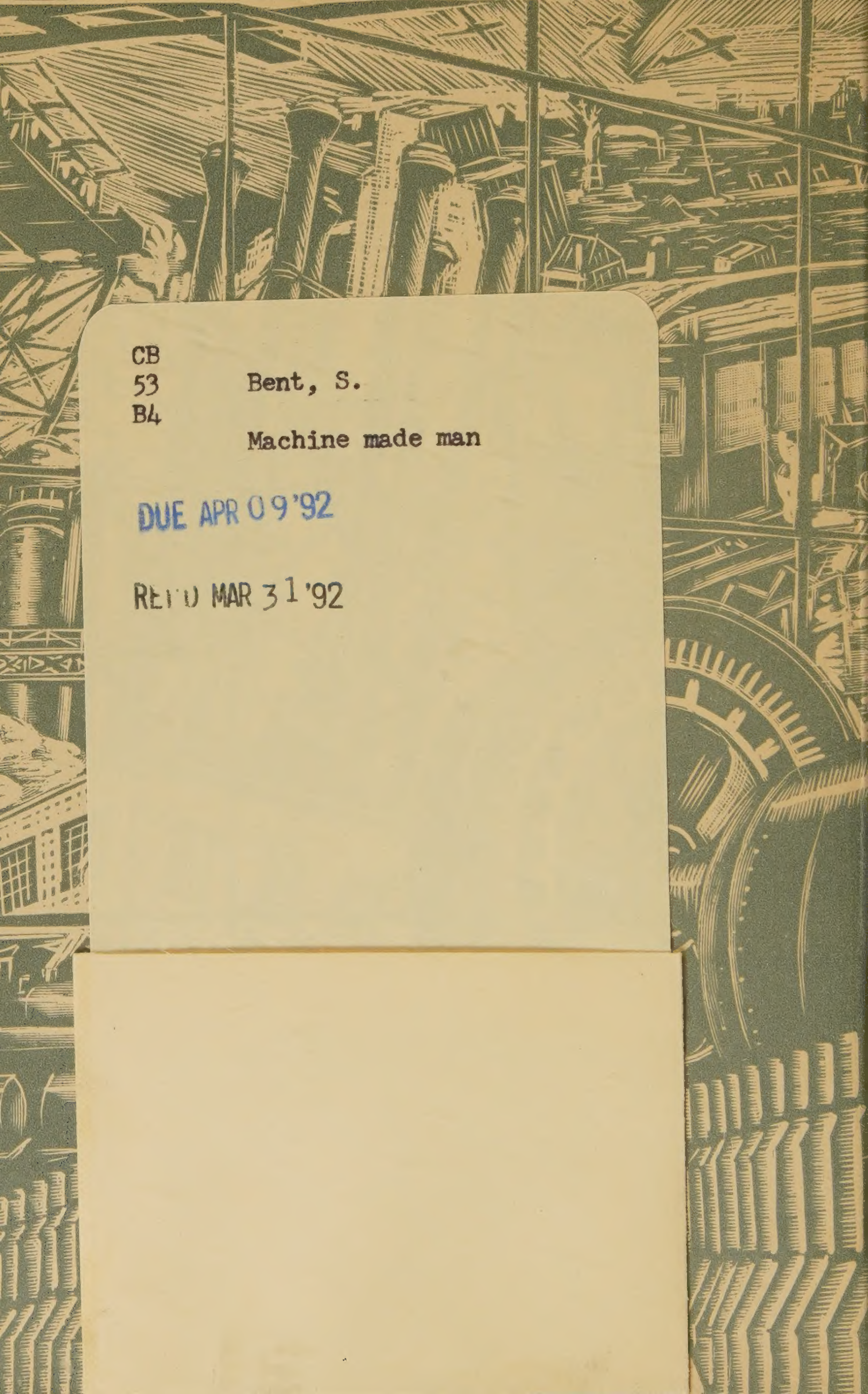

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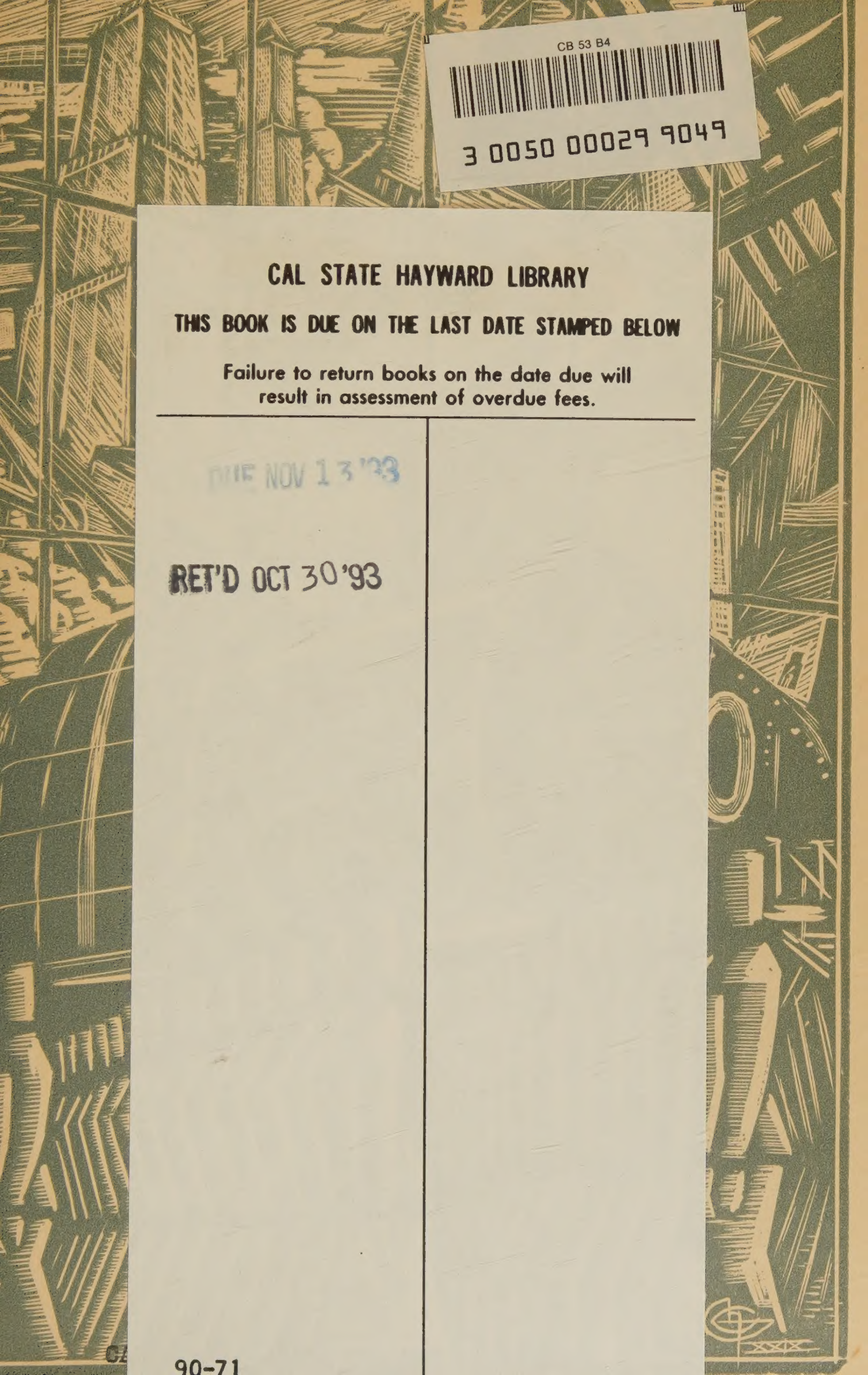

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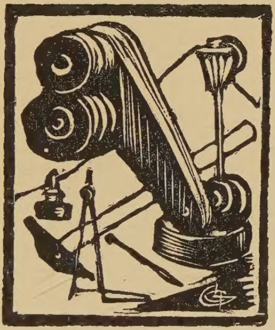

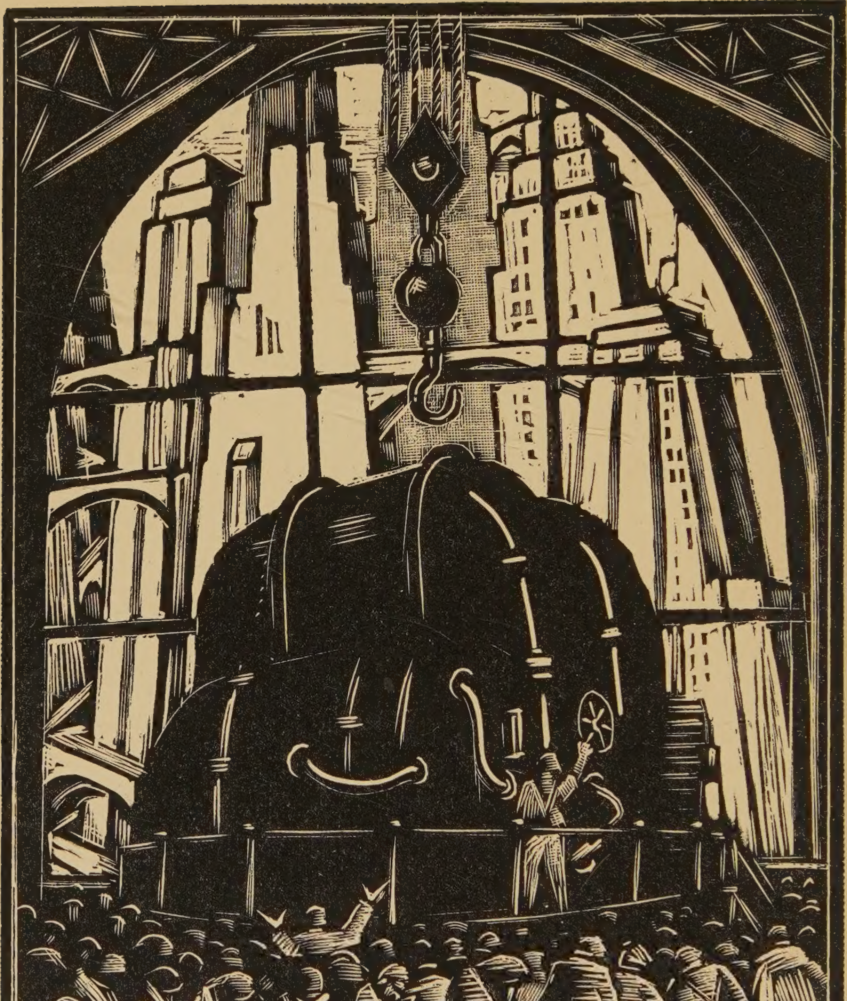
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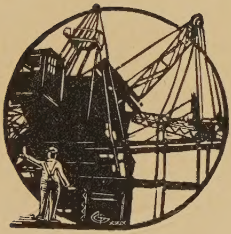
MACHINE MADE MAN

by

SILAS BENT

author of BALLYHOO, THE VOICE OF THE PRESS



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TO

MY WIFE

ELIZABETH SIMS BENT

ACKNOWLEDGMENTS

Parts of eight chapters of this book ran serially in *World's Work*, part of the material in the first of the chapters dealing with politics in *The New Republic*, the second chapter on politics (in somewhat different form), in *Scribner's Magazine*, and another chapter in the *Century Magazine*. To Horace M. Kallen I am much indebted for personal advice and suggestions, and I have had frequent recourse also to his books. Although a bibliography is appended, I think I should say that I have referred with frequency to Müller-Lyar's *History of Social Development*, to the Beards' *The Rise of American Civilization*, and to Schlesinger's *New Viewpoints in American History*. It has not seemed to me necessary to encumber the bibliography with notes on current magazines and newspapers.

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INTRODUCTION

I

It would be presumptuous of me, in view of the substantial library output dealing with the Machine Age, to venture upon this volume if I were not persuaded that fresh material could be offered and, perhaps, a different method of organizing it. My attempt here is to indicate the effect of the industrial revolution upon various departments of man's life, physical, social, commercial, political and cultural. Obviously encyclopædic in scope, such a subject can be but sketched within the compass of a single book, and I make no pretense of having done more. Aside from the history of civilization, the history of metals alone might well fill a fat tome. In an age when advertisers tell us of the "gallant, unencumbered confidence of metal," the "assurance," the "dignity" and "grace" of steel, when the honest merits of brass and copper are dinned into our ears, and when the consumption of minerals has reached its peak (we used more in the first quarter of this century than in all prior history), it is difficult to realize that in ancient Greece a lump of iron was worth a king's ransom, and that even in the Fourteenth Century Edward III classed the kitchen pots and pans among the royal jewels. We exported in tin containers during 1929 about $85,000,000 worth of goods, mostly farm products. The southern United States produce nearly two billion dollars' worth of minerals. The world's annual bill on account of rusted metals is calculated at five billion dollars. Contrast that, if you will, with the fact that borax, the first chemical utilized in industry, was gathered in Asian deserts six millenniums ago, transported on yaks and camels to Ur, and there employed by Chaldeans to purify and weld the gold for imperial crowns. Nowadays boron has descended to use in making soap and cosmetics.

Before I began this work it was suggested that I go at least as far back as Archimedes; one consequence was that I was disillusioned as to the discovery or invention of the lever. An entire chapter might well be devoted to the lever, and several chapters to the wheel, for modern machinery is but the elaboration and complication of primitive tools and devices. At no time, however, was there any thought of setting down the story of inventions; it seemed more engaging to note that, instead of the muscular development of the helot, each worker in manufacturing to-day has behind him more than four and one-half horse-power. And still more interesting were the ramified influences of the machine upon human mores, mental processes and institutions.

Freudianism, most popular of modern psychological cults, is based upon a variety of mechanisms. To what extent, one may well inquire, has this cult conditioned the literature of protest and revolt against the machine? Its predominant dogma, that individualism and the pleasure principle are in constant conflict with convention and the reality principle of the bustling world about us, seems quite in harmony with the complaint that the machine is coercing, depersonalizing and standardizing the globe. Pantagruel asserted that hunger for food actuated all human activities in whatever plane; the Freudian finds in sex expression and the translation of sex energies the sole basis of all pursuits. Rabelais has gone by the board, and a Viennese psychiatrist now colors a large part of our fiction, poetry, and drama. Following paths almost parallel, some of our essayists, historians, biographers, poets, and playwrights have attributed to the machine the repressions, complexes, neuroses and escape mechanisms of our febrile modern life. The forge, the factory, and the mill have supplanted *libido* in their symbolism. The coincidence, if it be nothing more, is noteworthy.

American writers are not alone in their discontent with a mechanistic civilization, of course. We have suffered also the slings and arrows of foreign critics. English lecturers return and report despondently on our gross materialism; Aldous Huxley even disparages our "Congolese style of dancing," although, if

I remember aright, I have seen this dancing quite correctly imitated in London night clubs. Henri Massis, in *A Defense of the West*, adds a French voice to the chorus. "One can imagine at a given period," he says, "the general suicide of this nation, which will have lost its soul in seeking the most perfected means of living, and, having found them, will blow up the machine, as if fascinated by chaos. . . . No nation has ever seemed to me to have felt so tragically the emptiness of its soul. Its moral life has become enfeebled in proportion as its material prosperity has grown. But what are the foundations of a spiritual life that is not nourished on the profoundest realities of humanity?"

II

Against the recurrent notes of despair, pessimism, and sex in literature James Douglas, an English critic who professes to stand for marriage, love, faith, goodness, kindness, brotherhood, any form of belief in God or man, says that "the heathen rage against me when I hold my nose in self-defense against literary ordure, or yawn in recoil from literary ennui." He thinks Mr. Huxley's *Point Counter Point* is "the apex of the clever modern cynicism which corrodes the mind," and asserts that Mr. Powys, in *Wolf Solent*, has "out-Aldoused Aldous." Julian Green's *Dark Journey* is condemned as a "masterpiece of morbidity." And he continues: "The poisonous influence of these depraved works of genius is twofold. They debauch the imagination of their readers. They also debauch the imagination of the novelists who are forced to compete with them in the market." He has mainly in view, it is evident, what I may term the Freudulent influence in literature. Our own writers, even those who are lowest in their minds about the Machine Age, surely do not deserve such severe abuse.

Most of our writers about the industrial revolution, however, are far from cheerful. One of them would organize a counter revolution by a return to nature on the land. To him the factory is the primary evil of our time, and is making most of us "mere cogs in a gigantic industrial machine." We are being reduced to a "dead level of uniformity." Conceding that creature comforts have been increased, he yet urges a sort of buyers' strike against factory products. He favors complete sex freedom, which would shock Mr. Douglas, the English critic, and hopes for an end of "the excessive importance which convention attaches to chastity." Freedom from religion, with its concepts of sin, immorality, heaven and hell, the reduction of governmental control, with at least three dogs to keep the salesman out: all these blessings, he believes, might come from an overthrow of the factory system.

Another more urbane critic of the Machine Age defends his faultfinding on this specious ground: "If a doctor pronounces a patient to have a bad circulation and a dangerous local infection in his leg, it cannot be complained of him that he has failed to speak the whole truth because he said nothing of what a good husband, loyal friend, and able executive the patient happens to be." This hardly sounds like the statement of a fair-minded and accomplished essayist; it sounds more like a plea in confession and avoidance for H. L. Mencken. The method described may do very well in the practice of medicine or in the *American Mercury*, for the physician does not pretend to diagnose character and the imitators of Mr. Mencken see only evil, hear only evil, write only evil. But in auditing the account of a civilization such a method can bring one out nowhere but in red ink. Without being a Pollyanna one may cast up the figures in both the credit and the debit columns.

Although this critic frankly ignores such benefits as may accrue from the machine, his observations about its disadvantages are so sound that they deserve attention. He draws a striking analogy, for example, in discussing that American propensity caricatured as "keeping up with the Joneses," and by economists described as maintaining our high (and sacred) standard of living. "The settlers who two centuries ago," he says, "had to jettison their cultural heritage and interests in order to cut down trees and snipe at Indians skulking behind those that had not been cut, have been replaced by the settlers in the Country of the High Standard who have to jettison their cultural tastes (the heritage is gone) in order to pay rent, get a cook, have two or three bathrooms and a motor car or two in this new frontier country of the Standard. They are just as pressed, hard-working and weary as their forefathers, and for the same reason."

Formula fiction, with types instead of characters and a plot put together with as much precision as a triple-expansion engine, the kind of stuff our more popular magazines are addicted to, disturbs still another critic, who blames it on the machine. And still another musters statistics to thicken the gloom of his view, although he does not permit his figures to lie to him, nor fail to puncture the arguments of some who entertain still gloomier thoughts. These are but a few of the voices lifted in the wilderness of our factories and smokestacks. Our poets, although they have found new rhythms and unique stimulation in the machine, still are despondent. Bruguière Church, for example, sings in the Autumn, 1929, *Century Magazine* of "Brownstone Fronts":

Watching a steam-shovel ripping up the remains
Of a half-block of old brownstone houses—
Gouging huge bites out of the vanquished dignity of porticoes,
Roaring and hissing and rattling ruthless jaws upon the crumbled gentility of high front stoops—
I thought—
It's the Twentieth Century feeding on the corpse of the Nineteenth—
Lusty young cannibal feasting on the body of his grandfather—
It's the Twentieth Century nourishing its sinews on the flesh of the Past,
Cracking with iron teeth the fine old ivory of the bones of Tradition
To get strength to build again.
It's the steam-shovel of the Twentieth Century, roaring and whistling:
Tear 'em down, the old brownstone manners and customs—
We don't want manners, we haven't any time for crinolines,
No time for families and Sunday dinners and strolls around the Reservoir—
Get out of the way, can't you see we're busy?
This's going to be a sixty-story office-building in six months' time.

Tear 'em down, the old brownstone fronts!
Shovel 'em up and cart 'em away.

It is quite true that the brownstone front sheltered a life more dignified and leisurely and spacious than our life to-day, and it is true that the machine is largely at fault in the change; but that the change is not irreparable seems to me a possibility which we may at least acknowledge.

III

Although the voices criticizing the Machine Age are variously attuned, and are lifted in different valleys or on separate hilltops of the wilderness, they are alike, if a generalization may be permitted, in that all of them are motivated by what is regarded as a warfare, more or less hopeless, between the free expression and functioning of the human mind and soul as against the corroding, unifying, and standardizing dominance of machinery. Must we, because we read the same kind of magazines and newspapers, hear the same kind of music, are subjected to the same kind of political, educational, and social propaganda, wear the same kind of clothes and eat the same kind of food, become as alike as the ants in a hill or the bees in a hive? Must women, who are more affected by the trends of this age than are men, bow to the authority of the textile manufacturer, who objects to the scantiness of their costume and has brought the fashion experts to his way of thinking? Must they return to the discomforts and ill-health of corsets and long skirts? Was their threatened revolt against the dictates of Parisian *couturières* but sound and fury, signifying nothing? Are we all, in a word, to become the servants and victims of the machine, or shall we be its masters and beneficiaries?

Itself a product of human ingenuity, the machine cannot rise above the level of the stream which produced it. If it is elevated to mastery, it must be by man, who is its creator; and that will come only if man accords to it that sort of mystic awe which Zoroastrians give to the Sun, Emersonians to the Oversoul, Catholics to the Virgin, Protestants to the Triune God. The metaphysics of prosperity is a religion of the machine, with Ford and Mellon and Edison as its triune messiah, with Captains of Industry as its hierarchy. So long as the United States continues to prostrate itself before this altar, the machine will continue to be regarded, as it is now, either as a god or a devil. But why dismiss as altogether "ugly" a civilization in which Joseph Pennell found so much of moving beauty? The Machine Age has evolved a new architecture, a new poetry, literature, music, and a fresh exfoliation of the graphic arts. If it has engendered a new religion, all we need in that field, apparently, is a reinvigorated spirit of doubt, heresy, iconoclasm.

S. B.

Bowling Green, Ky.,
December, 1929.

MACHINE MADE MAN

CHAPTER ONE

THE MACHINE: Genie or Juggernaut?

I

NEVER a child with growing pains was more self-conscious or more uncomfortable than this United States as it approaches the full stature of its industrial dynasty. On every side we hear the plaint that man is a Frankenstein, and has created a monster which will destroy him. Civilization is about to commit suicide. The evils of our age are dinned into our ears with the persistent percussion of a steel riveter. We are told that it is strident, blatant, restless, ostentatious, materialistic, soulless. Ossa of adjectives is piled upon Pelion of epithets. This is a technological era, to be sure, but mere sesquipedalian verbiage explains little. What, precisely, do we mean by a Machine Age?

We do not mean merely the period of the industrial revolution, which dates back to Arkwright and his spinning machine in 1764, to Watt and his steam engine in the following year. We go back in fact to Galileo and Copernicus and Newton. We date our civilization from the men who first began to glimpse a universe governed by laws rather than phantasms, and who set in motion the forces which make for "pure" science. The application of discoveries in that field have brought the airplane, the radio, and machines which far transcend the human senses in accuracy and scope. The Machine Age means, essentially, that man has utilized for his comfort, convenience and aggrandizement the acquisition, through nearly three centuries, of fresh granaries of knowledge.

Until Galileo's time the very principles which are the bases of all power machines were unknown to this earth; neither celestial nor terrestrial mechanics had been approached. Even the law of gravity was unsuspected until 1650. Before that, "levity" was discussed solemnly in learned society. When we remember that man is supposed to have existed in somewhat his present form on the earth for perhaps fifty thousand years we perceive that, proportionally, he is only a few hours past his kindergarten days. Yet he no longer shapes his activities according to a Delphic oracle, the flight of birds, or the entrails of slain animals. He no longer sacrifices his children on the block or in furnaces, no longer drowns or burns witches and Joans—at least in the western world. Dr. Eddington and Dr. Millikan and Dr. Michelson escape the wheel and the rack, even though they tell us the most disconcerting things about the insubstantiality of the material world, about biology and the nature of light. During the Machine Age our notions of our physical environment and our place in it have altered drastically and, I venture to believe, for the better.

Not that I would venture to deny the danger implicit in making the production of commodities the be-all and the end-all of a nation's life. Progress is always achieved at a price, and we are paying, undoubtedly, a heavy bill for our machines. We are indeed a machine-minded people. The very use of pocket cigarette lighters betrays our fondness for automatic toys. These things are bulkier and clumsier than the small papers of "safety" matches now supplied at every tobacco shop. Their use abroad, in those countries where the production of matches is a government monopoly, and where the matches are extremely undependable, is easy to understand; but that they are in common use in the United States bespeaks only our fondness for any sort of machine. And undoubtedly the cheap machine-made cigarette has contributed to the vast increase in the consumption of tobacco in that form. In my young manhood we rolled our own. In this push-button age we scorn even so much manual exertion as that.

II

No, we rejoice that the engineer of a ship, by moving a lever, can loose fifty thousand horse-power; that the day laborer's hand on the controller of a steam shovel commands a thousand slaves.

The food we eat, the clothes we wear, the homes and offices that shelter us (our cities are mostly cell-blocks), and the devices for lighting, cleaning, cooling and ventilating these buildings; our recreation, our government, our means of moving about and of communicating to one another our ideas, experiences and emotions; our armies and navies, our churches and schools, even our spiritual outlook, all are profoundly affected by this amazing thing, the machine. Modern genius has evoked a standing army of Jinn. But modern genius has not, in many cases, evolved the instrumentalities of social control for these fabulous forces.

Let us catalogue, baldly, the inventions since the steam engine. It is true that the inventors often merely perfected what others had first thought of, or applied principles discovered by others, and that dates are often deceptive; but striking as near as may be at the facts, we arrive at this list for the Eighteenth Century: Cartwright's machine loom, 1785; Robert's paper-making machine, 1799; the iron puddling process, 1780; the threshing machine, and the glass chimney for oil lamps, 1783; Galvanism, 1780. It was not until 1803 that we learned to get gas from coal, not until 1811 that we had a mowing machine, not until 1814 that the sewing machine lightened the labors of the housewife. Other inventions of consequence followed speedily: the velocipede, which smoothed the way for the bicycle and the automobile, 1817; the steering wheel, 1821; turbines, 1824; photography, 1828; locomotives, 1829; the telegraph, 1833; guncotton and nitroglycerine, 1846; internal combustion engines, driven by gas power, 1858; telephones, 1861; the knitting machine driven by a dynamo, 1867; dynamite, 1867; indigo from tar, 1876. George Westinghouse invented a rotary engine when he was fifteen years old, in 1861. His air brake, to use on railroad trains, was not invented until after the Civil War. Thomas A. Edison's main contributions to the Machine Age may be listed as follows:

1869—The Universal stock ticker, with Franklin L. Pope.
1870—Assisted Sholes in first working model of the typewriter.
1876-77—The carbon telephone receiver.

1877—The phonograph.
1879—The incandescent electric lamp.
1880-82—A life-sized electric railway installed at Menlo Park.
1891—The motion-picture camera.
1900-10—The Alkaline storage battery.
1912—Introduced the kinetophone or talking motion picture.

In nearly every case these inventions were in effect the elaboration of tools in earlier use, and the application to them of artificial power. Thus a milling machine weighing several tons might rotate a tool weighing only thirty pounds. It is a tenet of the Machine Age that those tons of metal are justified by the elimination of vibration and of human fallibility. If the machine has so largely supplanted the man it is largely because the man has been weighed in the balance and found wanting. Let those who bewail the passing of the guilds, craftsmanship, and personal pride in the product, put that in their pipes and smoke it.

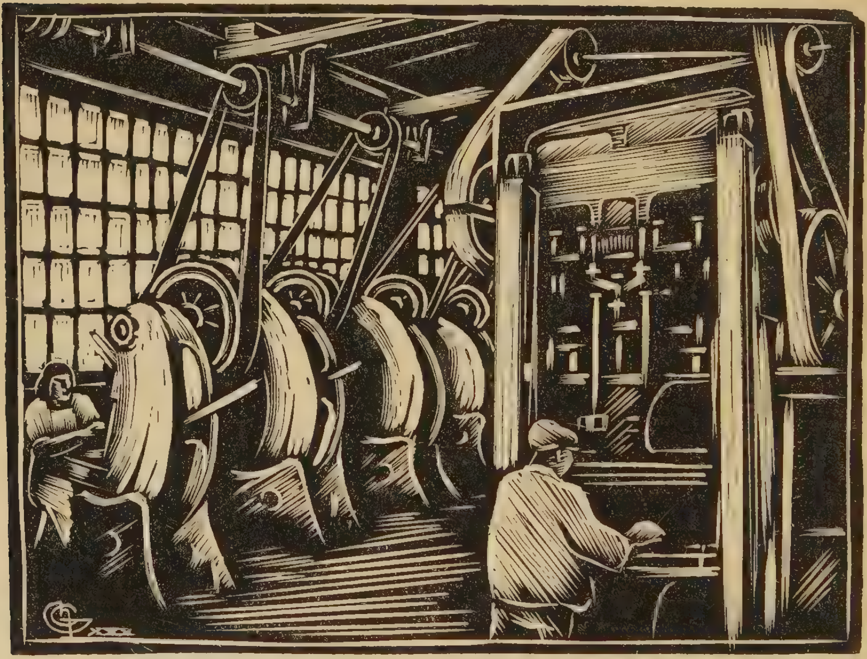
The automobile, the airplane, the dirigible, and the wireless, although the fruit of Nineteenth Century inquiries, did not assume industrial proportions until the Twentieth. We now measure the heat radiated by stars hundreds of light-years away by a device about one-thousandth as large as a drop of water and weighing about one-thirtieth of a milligram. Betelgeuse, which is twenty-seven million times as big as our sun, gives more heat than any other tested: it increased the temperature of the receiver by one-sixtieth of a degree centigrade. Red old Antares, which is 330 light-years away (a light-year is roughly six billion miles), ran Betelgeuse a close second, and Sirius, which is comparatively close, was third. And an instrument one thousand times as sensitive as the human ear warns pilots of the direction of another ship's siren in a fog. During this century the machine made possible the parcel post in 1913, the first transcontinental telephone line in 1915, the first air mail deliveries in 1918, photographs by wire in 1925 and trans-Atlantic radio telephony in 1927. Street cars are now fitted with automotive brakes and roller bearings, railroads have been electrified for suburban service, and the well-nigh insufferable Pullman berth has been supplanted—at exorbitant cost—by a real room with a real bed and the possibility of dressing in private instead of amid the obscenity of the smoking compartment. Television has become an actuality and may soon be commercialized. We have a new alloy which cuts steel, and we can harden cardboard to the strength of iron. Wonders multiply. An automatic chemist tests a city's water supply for impurities and is on the job twenty-four hours a day, not just once in every so often; traffic is automatically regulated, food automatically served (some one has said that the man who feels at home in an American automat restaurant is a real democrat), doors are opened, planes and ships guided, and plants operated, by mechanical robots.

III

In the factory the machine has brought mass production and unexampled prosperity. The United States is the world's lustiest, richest child. We are seven times as wealthy as we were half a century ago, and we have an income annually of ninety-odd billion dollars. We vow we have the highest standard of living ever known to history. I for my part have long been skeptical of that phrase, "standard of living." Don't we really mean rate of spending? Do we really *live* on a fuller scale or a higher plane? I doubt whether any one nowadays has a higher standard of living than the southern planter before the Civil War. He stood on the backs of black slaves, of course, to reach the higher, just as Greece built her culture on the backs of helots and Rome on the backs of military captives. The Roman had his baths no less than ours. Do we live the higher, then, by reason of radio jazz broadcasts, incandescent lights, vacuum cleaners, and electric refrigerators? In a decade the people of this country bought eight million vacuum cleaners, five million electric washing machines, a million and a half electric refrigerators, and thirteen million wireless receiving sets. Nor is the end yet. The Report on Recent Economic Changes, instigated by Herbert Hoover and signed by him, says:

> The survey has proved conclusively what has long been held theoretically to be true, that wants are almost insatiable; that one want satisfied makes way for another. The conclusion is that economically we have a boundless field before us; that there are new wants which will make way endlessly for newer wants, as fast as they are satisfied.

This is more comforting to the manufacturer than to Father, who foots the bills. The Department of Commerce tells him that the average American family has a purchasing power one-third greater than in 1914; Mr. Average Father needs it. His father didn't have to buy one or two automobiles, a phonograph, or a radio set. His father didn't have to pay for a telephone or a vacuum cleaner or an electric refrigerator. In 1914 there were only two million automobiles in the United States, whereas in 1929 there are more than twenty-two millions. Nor did Father's father have to pay exorbitant fees to the doctor and the dentist, to



hospitals and nurses. Father's mother didn't wear silk stockings or fur coats; she would have blushed to be caught using rouge or a lipstick, and she knew nothing of two-dollar motion pictures. Clothes were washed with soap in her day, dishes with a rag, the floors with a mop. The furniture was dusted by hand, with a cloth and a feather contrivance. Grandmother knew nothing of coffee percolators, heat-proof glass, automatic control of oven temperatures, or sewing machines operated by electricity. The housewife of to-day lives in luxurious ease compared with the housewife during the Nineteenth Century, if that be a higher standard of living; for Father it means mostly a higher rate of spending.

Moreover, merchant tailors have decreed arbitrarily that Father, if he is to consider himself well dressed, must have a minimum of twenty suits of clothes, twelve hats, eight overcoats, and two dozen pairs of shoes. His womenfolk scorn to confine and crib and cramp themselves with figures so trivial. They've got to keep up with the Joneses. And the Joneses, during 1928, sixty millions of them, spent about $6.50 each in beauty parlors, so that the national bill ran close to four hundred millions. What Grandmother would have regarded as downright immorality the Younger Generation regards as a good investment. Nor has the Younger Generation an exclusive lien on such notions. Mother, for that matter, has got to keep up with the maid, if she has one, for the maid would count it beneath her dignity to do kitchen work in cotton stockings. Here we have a glimpse of that stimulated "insatiable demand" of which Mr. Hoover's economists spoke.

IV

Father stands the gaff, too, in his tax bills. It is estimated that the average working person in the United States pays $250 a year on that score, and labors an hour a day to pay it. Your Uncle Sam, forty-eight State governments, and half a million local administrations spend between them some eleven billions a year. Of your Uncle Sam's three billions, more than four-fifths goes for warfare past and prospective. He is collecting more and more, if it interests you, on tobacco; forty millions more on cigarettes alone for the fiscal year 1929 than for the preceding year, and on cigarettes are paid more than three-fourths of the tobacco taxes levied. There was a boom in the stamps required for stock market transactions, and from the income tax on individuals and corporations about two and one-third billions were derived. Considerably more than one and one-half billions go for interest and debt redemption, incurred almost wholly by warfare. The Federal government spends twelve per cent. of its income to maintain the army and navy, about one-tenth of one per cent. on education and three-fourths of one per cent. on social welfare, courts, and prisons. The total outgo for wars past and present is more than seven-tenths. The States spend only one and one-half billions a year; local administrations—wastefully, one may be sure—about seven and one-half billions.

Such is the cost of governing a country whose civilization is founded upon the machine. In part the cost arises from the maladjustment between a form of government deriving from the days when land was the basis of civilization and a government that should be shaped primarily to meet industrial problems. We are trying to reconcile agencies adapted to an agricultural economy with the Machine Age, and we pay through the nose. There is a deal of talk about the "farm problem," but the primary concern of Washington and of all State capitals is Big Business. And although the Machine Age is technological, there is nothing technological about politics, nothing scientific about our government. Perhaps in time we will give the technician a wider range than he enjoys to-day in the Bureau of Standards.

V

Other nerves beside the pocket-nerve are touched and irritated by our mechanized way of living. We are restless beyond precedent. Marveling that our newspapers print eyewitness accounts of happenings in Shanghai before they have actually happened by the clock, so far does wireless outstrip his lordship the sun, we come to expect ourselves to beat the clock and to annihilate space. Even Henry Ford yields to the popular demand for speedier automobiles, although greater speed means more fatalities, and already the annual toll of life and injuries from the motor is almost as great as this country's total losses during the World War. And here is Miss Blanche Yurka complaining that the speed mania has invaded the theater, to its detriment, since playwrights boast that they turn out their three acts in a fortnight, and managers read scripts, select casts, hold rehearsals and rush into production at a breathless pace. All of us are tense with a corroding effort to telescope the calendar.

There is a familiar story about a distinguished Chinese visitor to New York, who was shunted by his host from a local train, in the subway, to an express. Why the change? he wanted to know. Because, he was told, it meant a saving of two minutes. When the destination was reached the Oriental inquired blandly: "Now that we have saved two minutes, what are we going to do with them?"

The question is pat to-day, for we have sped things up until we have an unexampled leisure. President Hoover undertook to answer the query in a message to the National Recreation Congress, which held its 1929 convention in Louisville, Kentucky.

> This civilization [he wrote] is not going to depend so much on what we do when we work as what we do in our time off. We are organizing the production of leisure. We need better organization for its consumption.

Mr. Hoover is an engineer, and his statement has a technological sound, but not a hint of leisureliness. How is one to organize for the enjoyment of idleness and at the same time invite his soul? It is all very well to organize for golf or tennis or any other form of play, but in that event play ceases to be leisure in any true sense. "The trouble with New York to-day," says Professor William P. Montague of the Department of Philosophy at Columbia University, "is the wide misuse of sudden leisure. This is a natural phenomenon whenever a lower class gets a look-in on higher standards." And Professor Harry L. Hollingsworth, who teaches psychology in the same institution of learning, charges us with lack of spontaneity. He says the Machine Age is producing a passive type to supplant the active citizens of earlier days. "New York life," he adds, "admits no back-to-nature tactics even in play. The organization of the city's business demands vast hordes of workers, stolidly uniform in pattern, who can stand the gaff of deadening routine. . . . As regards recreation, New York has quite definitely forsaken the arena for a seat among the spectators." What he says applies with equal force to most of our large cities, although the well-to-do nearly everywhere organize in considerable numbers to get as close to nature as the golf links permit.

Neither of these men touches, in the passages quoted, upon that lack of inner resources which so impairs leisure in the Machine Age. When Walt Whitman loafed and invited his soul it was possible, presumably, because he had a soul to invite, and one that would accept an invitation. The Machine Age has an up-and-coming, impatient soul, chary of attending affairs where there's nothing doing. It feeds on swift superficial excitements. "Movies" and "talkies," tabloid picture papers and fast automobiles, are its delights. The eight-hour day and the five-day working week begin to lose their significance in any higher standard of living, if one takes the phrase seriously, when the hours and days set free are devoted to the pursuit of trivia.

Some of the characteristics of the machine are reflected in the majority of this country's population. The people are subdued somewhat by the milieu they work in. There is a tendency toward conformity to pattern, cheapness, deterioration, and lack of personality. "Whoso would be a man," said Emerson, "must be a nonconformist." Well, Emerson is passé nowadays, and our young intellectuals sniff at the mere mention of his name, while most of us have only the vaguest notion of what he stood for. Even those who profess to be nonconforming have their own set of rigid conventions, and are alike in that they are trying to be unlike the herd. We are an Arrow-collar people, dressing alike, thinking alike, and subject to like emotions. The standardization that is an essential of mass production appears to have found reflection in our public.

VI

A factor in the nervousness of city-dwellers, obviously, is noise, and it is chiefly a machine-made noise. It is no longer adequate to speak of a muffled roar or a subdued hum in any American metropolis. Anita Loos put into the mouth of one of her characters the observation that Paris had a feminine sound, but that New York's was masculine. So is Chicago's and Detroit's and Duluth's and Cleveland's and Houston's and Kansas City's and Philadelphia's and the rest of them. It is a cacophony of gas engines, horns, and sirens, whistles, riveters, rattles, transit underground and above, and cut-out motors. Sudden loud sounds cause heart changes, alter the breathing rate, and make the muscles tense. It has been found that a typist uses one-fifth more energy if she is working in a noisy office; and it has been found that persons asleep, presumably unconscious of the noises they hear, are subject to heightened blood pressure and the other unfavorable symptoms set down; more than that, the body-changes last, on an average, half an hour after the disturbance has ceased. Even rural districts are not immune from the noise of airplanes overhead, at any and all hours. The machine tends to standardize all of our nervous systems.

Standardization and mass production mark our educational processes, too, especially in our public schools. It is often said that the purpose nowadays of the three R's is not to lead the student out of himself to higher things, but to reproduce a pattern. The charge lies even against our colleges and universities, and the indictment has been drawn by men teaching in them, not by envious outsiders.

Dr. John Grier Hibben of Princeton, while not joining in this charge, perceives certain "subtle and insidious" dangers in prosperity, which has become a sort of national religion, and the slogan on which the major political parties seek our suffrage.

"We must all," says Dr. Hibben, "be on our guard against allowing a sense of power to dull our sensibilities and to use prosperity as a means to unworthy ends. Nor must we allow a starvation of the soul. With the growth of wealth and expanding resources of increased power, there is the danger that the soul may become small and mean and base. Finally, we must be careful not to let prosperity become alien to religious impulse and aspiration. We must remember that religious inspiration is just as necessary in times of prosperity as in adversity." Let us hope that this exhortation is not merely rhetorical, not simply a counsel of perfection. Undoubtedly our conquest of nature and our progress in scientific fields far outrun our advance in other directions.

However, there is no monopoly of knowledge. The son of immigrants may become a Steinmetz as readily as the son of New England aristocrats may become president of Harvard University. Technology knows no caste; the Machine Age is no respecter of birth or antecedents. The presidents and other high executives of most of our railroads began as clerks or brakemen or locomotive firemen and engineers. To a large extent this is true in our factories and mills. We are fond of saying that the serf of the agricultural economy has been succeeded by the "wage slave" of to-day, but the serf never had such opportunities for ascent as are open now to the lowliest workman.

VII

Here we have one of the advantages of the Machine Age, to set off against its compensatory drawbacks. In spite of that advantage, it is true, workmen are like the rest of the population in that they tend to postpone the age of marriage, for economic reasons; the birth rate is falling except in the lowest economic stratum; the average income of persons gainfully employed is but $2,200 a year, whereas nearly ten thousand persons pay taxes on incomes ranging from $100,000 to a million a year, more than two hundred on incomes of more than a million, and fourteen on incomes of five millions or more. The distribution of our wealth is open to question, but it is worth remembering that some of those who pay taxes on immense incomes started as day laborers, and that in his forties Henry Ford didn't have the money to buy a Thanksgiving turkey. The fact is that the worker gets more to-day for his labor than ever before, in food and clothing and shelter, in sports and play, in education, and access to literature. Government is more humane, and the family, despite its restricted quarters, more secure. The evils that the Machine Age has brought are transitional, for technology by its very nature contains the seed of growth and of its own reorganization.

As for health, none can deny that pestilence and famine have about disappeared from mechanized civilizations. Age-old ailments are being conquered, and life is being lengthened, chiefly by the reduction of infant mortality. The smoke and gas in the atmospheres of our large cities do cut off about three-fourths of the ultra-violet rays which are the principal health-giving property of sunlight. Headaches are common and in many cases are due to inhaling diluted carbon monoxide gas from motor exhausts. But we make ultra-violet rays by machinery now, and can administer them in proper dosage to any one; "take your sunlight à la carte," urges the Y.M.C.A. Aspirin tablets are cheap and comparatively harmless for those who have headaches. Cholera and typhoid fever are rare, and disastrous mediæval epidemics no longer sweep the western world.

Dr. Hu Shih, a learned Chinese, perceives in the Machine Age not only the physical advantages of improved health, but spiritual benefits unknown to the Orient. He avers that the western mastery of matter is a real spirituality, and that the masses of Europe and the United States are freer, happier, and safer than the masses of Asia; that they are so because what we call "materialism" is in truth a spiritualization of matter, whereas in the East spirituality is but an escape from matter which has not been conquered and is not understood. Surely it is true that as the scientist depicts the world around the modern man in more illusory perspective, there is the greater need that man keep himself fit and on tiptoe to operate and control the powerful, beneficent and dangerous machinery he is building. This involves, as a fact, a sort of morality not unlike protective coloration. The old theologies of rhetoric and tradition may be losing ground, and the established denominations may, as one clergyman charges, be "peddling" religion. We may cut loose from the Ten Commandments and from divine admonitions, but the Machine Age seems certain to breed an ethics no lower in the scale.

VIII

There remains the disquieting thought that another World War may destroy modern civilization. Indeed, some male Cassandras are still predicting that the yellow hordes of the East will yet overrun the western world. It is safe to say, I think, that there will never be another Genghis Khan or Tamerlane unless the East masters the machine as the West has mastered it. Only the wildest phantasist can picture an old-fashioned army as defeating western armies with their poison gases, their mechanical batteries which destroy targets invisible to the gun crew, and their terrific explosives. But warfare between nations whose civilization is founded on the machine presents more serious implications.

Despite the jingo press (will we never have a journalistic disarmament?), despite the army and navy "experts," and despite the employment of paid propagandists to befuddle Geneva conferences, the talk about "the next war" arises largely, I suspect, from the fact that we are still employing, in this modern period of transition, the vocabulary of the Middle Ages. Diplomacy in particular is enamored of that lexicon. In very truth words are changing in meaning as the times change with the machine. War is no longer a matter for professional militarists; it is up the alley of the scientist. Victory no longer pays; either victory or defeat means an economic debacle. Wealth cannot be picked up and moved about nowadays; it is not portable. The Franco-German war of 1870 was the last war in the western world which meant profits for the victor, and it meant profits because the machine, although it had sprouted, had not yet come into flower. It was a professional war, and the better military machine acquired the rich province of Alsace-Lorraine and five billion French francs. France and England, victors in the World War, have not yet recovered from the decisive and disastrous effects of that triumph. How is Germany to pay even a fraction of the cost? Her total convertible wealth is insignificant in comparison to the victors' loss; modern usage does not permit selling her population into slavery, and even if it did the economic wounds would not be healed; and if in revenge Germany's industrial fabric were torn to shreds, it would merely destroy her capacity to pay such reparations as are now demanded.

Victory, then, does not mean now what it meant in earlier days, although we think of it in the same terms. We are applying old words to new ways of living, but have no new definitions for them. "Peace," "war," "caste," "bourgeoisie," mean totally different things in the Twentieth Century from the things they designated in the Seventeenth. We are woefully in want of terms wherewith to delimit with precision the realities of the new era in which we move and have our being, or to describe the miracles of the Machine Age. Misunderstandings due to the use of outworn verbiage, especially by the junkers of the western world, seem to me as great a danger as the commercial rivalries that Walter Lippman described in *The Stakes of Diplomacy*. We must devise a new language congruous with a new environment and a new culture.

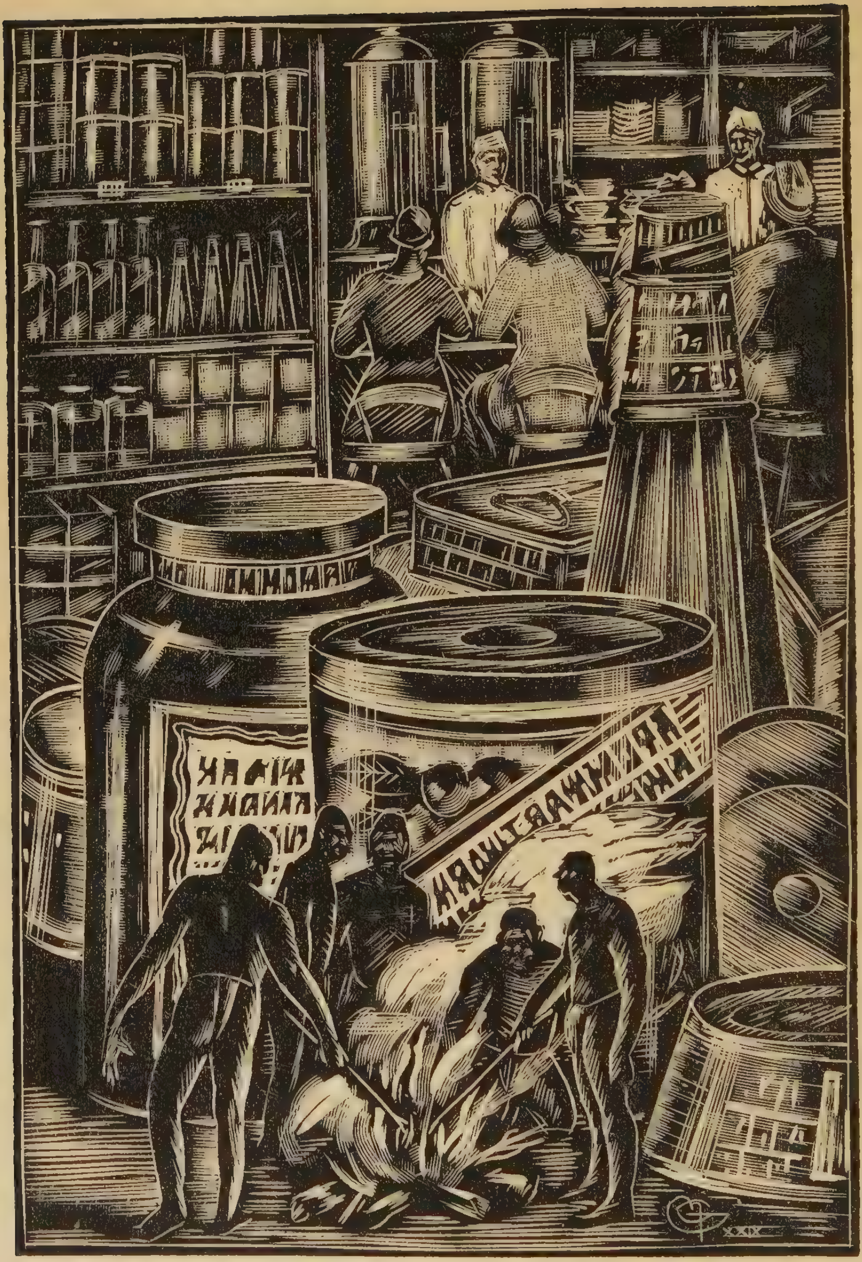
Plato spoke of man as a tool-using animal. Man was master of his tools, and they were portable. In our factories and mills the machines are not portable. The woodman carried his ax with him, and it was obedient to his brawn, but the operator of a sawmill machine is obedient to its rhythm. Although Emerson thought that the man slavishly tending a machine was no better than a dog turning a spit, he yet noted the contrast between the well-clad, reading, writing, thinking American, with a watch, a pencil, and a bill of exchange in his pocket, and the naked New Zealander, whose property was a club, a spear, a mat, and an undivided twentieth of a shed to sleep under.

IX

Thinking, in so far as the western world undertakes it nowadays, is a by-product of reading and writing, as truly as every machine is a by-product of other machines. It is difficult to suppose that the human mind has gained in power since the day of Socrates; we think no more ably about thinking, but more expertly about things; and the machine has spread literacy about with so lavish a hand that the wisdom of Socrates is available to all, instead of being restricted, as it was before the industrial revolution, to the clergy and the gentry. The printing press is charged with the high crime of leveling literature. Well, democracy itself is a leveler, and democracy could not continue as a viable form of thought or of government without the printing press. The cotton gin is charged with making the South a single-crop area, the locomotive with dethroning King Cotton. Well, these two machines between them helped abolish human slavery in the United States. The automobile, indicted on too many counts to be set down here, is yet responsible for extraordinary economic and social progress. Those who to-day deplore the machine may be ready to-morrow to deify and canonize it. MacKnight Black, in his volume of verse, *Machinery*, sings:

> Dynamos are bosoms,
> Round with the sweet first-filling of a new mother's milk.
> The lowlands have fostered enough of sons, and the hills, and the sea,
> Now a strange mother with nipples of iron gives suck to a nation;
> At her side the young towns take strength on their lips.

No good ground remains for the pessimists who believe that modern mechanistic civilization is subject to the same destructive influences as the old agricultural economies. Early Christian theologians believed that the end of Rome meant the end of the world, but it did not; nor can the Machine Age be destroyed as was Roman culture. A civilization founded on the machine can be destroyed only by the extinction of human life. When earlier and less stable cultures collapsed, human life still persisted. And if we are invulnerable to Eastern warriors, we are also spending so much of our vitality and energy in construction, in digging and in mounting up with wings as an eagle that there remains little or no surplus energy to drive us to a war of aggrandizement. Something of dignity and repose may have gone temporarily out of our lives as a people; but we may well suppose that the next generation will master the evils which now so confuse us, and will live, after all, the richest and fullest life this planet has seen.



CHAPTER TWO

FOOD: From Barbecue to Delicatessen Dinner

I

CASANOVA complained that he could get neither soups nor desserts in the London restaurants of the middle Eighteenth Century. A rake, soldier of fortune, duelist and diplomat, he had sat at epicurean Continental tables, and he vowed the English dinner was like eternity, with no beginning and no end. Such an indictment cannot be drawn now against either the English or the American table. In the United States we levy against all the world for delicacies, relishes, beverages. Argentina sends us her asparagus, Canada her rhubarb, Czechoslovakia her pickles, Belgium her grapes, Bermuda her potatoes, Madagascar her spices, Hungary her paprika, China her teas, Brazil her coffee—yea, and Australia her onions. And the machine does the work, not caravans of slaves.

More than that, civilized man can now, to all intents and purposes, live without cooks, for machinery can do his cooking for him. It will boil his breakfast eggs two, three, or five minutes, according to the time gauge, with no further attention from a human attendant; it will toast his bread on an endless belt, running above electric heaters; it will cut and bake his rolls with greater precision than the hand has achieved, and it will not only cut bread but butter it. In big hotels there are devices which attend to four thousand slices in an hour. And the ovens of gas or electric ranges are equipped with appliances that automatically regulate the heat, even stopping it at the end of a certain time. There are machines for paring apples and potatoes much more economically than the kitchen attendant can do it. And there are other machines that will wash the dishes and silver, burnishing the latter painstakingly. Two thousand plates an hour and twelve hundred forks are within the scope of these robots in their larger sizes.

But, although man can do without cooks, he cannot assimilate food without water, and the machine has come to his aid in supplying him constantly with a pure and fresh supply. In 1929 New York City, for example, constructed more than twenty miles of new water tunnel, from the Yonkers reservoir to Brooklyn. The tube passed under the Bronx and Queens, burrowing twice under the Bronx River and once under the East River; it passed under Newtown Creek and the Wallabout Canal. Seventeen construction shafts were sunk by machinery to enable other machines to bore the tunnel five hundred feet below sea level, and some of the shafts measured eight hundred feet in depth. To operate air-compressing machines, which excavated rock, sank shafts, lowered tools and material, lifted débris, mixed and poured concrete, electricity with a muscle-power equivalent to that of one hundred and eighty thousand men was utilized. And thanks to the machine, the work was done in a fraction of the time that would have been required had mere man, unaided, undertaken it. Facts such as these need to be taken into account in auditing the account for and against the machine. No such audit can be made, even superficially, without revealing man's indebtedness to automatic power in his progress from the intertidal slime to his present eminence.

Food and water were the primary necessities, shelter the second, clothes the third, weapons the fourth. But the machine does not stop, of course, when it has put its stamp on necessities; it goes on to necessaries, then to luxuries; and the luxuries of to-day become the necessaries—or so they are regarded—of the year after next; it moves on to fiction, amusements, art and education.

II

The standards of food production, preparation, and consumption afford a fair yardstick to lay along the culture of any people; and during the last century these standards have been swiftly lifted and altered through the application of machinery to culinary economy. Meat is now dressed and packed by machinery; from the four corners of the earth spices, staples and delicacies are borne every whither in carriers made possible by the harnessing of steam and by the internal combustion engine; and bread is kneaded by arms of steel which have the strength of a thousand housewives.

Primeval man, if no running water was near, took his drink from a stagnant pool; and his food was no better, in many cases, than his drink. He was not a hunter of the mammoth, the lion and the bear, as we are fond of supposing. He was glad to kill a rabbit, or even a rat, with a handy stone. He ate nuts and wild fruits, leaf buds, fungi, birds' eggs, and the honey of wild bees; snails and frogs, now prized in some places; fish, dead or alive, fresh-water mussels, molluscs and seaweeds; he was not above snakes and caterpillars. (Some Chinese eat caterpillars to this day.) And he smashed bones to get the marrow out of them.

Our ancestors, that is to say, were hard put to it, in all probability, to find sustenance. They did not begin to do any real cooking until the pot was invented. If they had learned to strike fire they may have barbecued animals whole, on forked sticks above the flames. These things are problematical; but we may suppose that roasted meat of a sort was possible—and Lamb's story of the discovery after a cottage had accidentally burned of the deliciousness of roast pig may not be so fanciful—or we may even suppose that, by putting hot stones into a scooped-out place in the earth, man had made his first start toward the fireless cooker. Probably the pot itself was a discovery rather than an invention. The theory is that baskets of woven-ware were covered with clay, and that when these were set above the fire the clay was hardened, revealing that the woven-ware wasn't necessary; so that afterward man fashioned pots with his hands, even before he discovered the wheel. Then it became possible to boil water, and our forefathers were on the way to become gourmets.

But it was a long way; even the European Neolithic man, who had learned the dietetic value of wheat, and crushed it for bread, had no yeast, and we do not know whether yeast was first utilized to make bread more palatable or to ferment drinks. If civilization were spread evenly over the world it would be an easy thing to date—within a thousand years or so—momentous occasions of this sort. As a fact civilization was cradled probably in northern Africa, and separately in the Orient; from Africa it moved westward. The Nordic European had been subsisting six or eight thousand years before he learned the uses of metals, and really began cooking.

The Romans, who are credited as a rule with the first bathtubs, are credited also with being the first banqueters. Neither is true. Not long since there was found in the ancient city of Olynthus, in northern Greece, a bathtub probably three thousand years old, shaped very much like those we use to-day, and used even before Alexander the Great had begun his conquests. And as for feasting, *Mene, mene, tekel upharsin* was written on the wall of Nebuchadnezzar's banquet hall six centuries before Christ. (Even in that day an effete Babylonian monarch was weighed in the balance and found wanting.) In Egypt a hundred slaves and Heaven knows how many camels were constantly kept busy that the pharaohs might have fresh, cool water. Huge jars of porous pottery were the containers, and by evaporation kept their contents cool against the sun-baked desert. More, these caravans brought from the mountain tops snow, wherewith to make sherbets for the royal table.

But it must be admitted that the Romans brought culinary art to a higher point than their predecessors. They had their expert commissariat, which assembled from distant points, for their tables, meats and fishes and fowl and peacocks' tongues. Nero's guests, reclining on the left elbow at his richly laden board, looked up at a pivoted and revolving ceiling, beguilingly decorated. During the reigns of Augustus and Tiberius the most famous of the epicures was Marcus Gabius Apicius, who spent his all on comestibles. He began as a multimillionaire ($3,800,000, his fortune has been estimated at, which was a great deal of money in the days when wealth was movable), and he spent it, or squandered it, in procuring and inventing rare dishes. When he cast up his accounts and found that he had only sesterces equivalent to a few hundred thousand of our dollars, he destroyed himself rather than starve on such a pittance.

Adjoining Nero's banquet hall, and most of the dining rooms in Roman mansions, were vomitoriums; for the Romans dined not wisely but too much.

III

It was in the matter of an essential water supply that the Romans far excelled all their predecessors. The Phœnicians and Persians had constructed subterranean channels, with vertical shafts at intervals; and Herodotus tells of a Greek aqueduct at Satmoas with a gallery eight feet square. But aqueducts were the most distinctively national structures achieved by the Romans. Some of them show to-day examples of stonework as fine as man has achieved anywhere; others were of concrete, faced with brick. The most imposing of them was built by Quintus Marcius Rex—the Aqua Claudia—and was dedicated August 1, 52, on his birthday. It had blowholes for ventilation and inspection, pools of gravel to purify the water, a reservoir at its head and another in Rome, with purifying and storing compartments. Not until nearly two millenniums later was it surpassed.

The Romans, that is to say, wanted running water: they were not to be put off with wells and cisterns. Earlier peoples were not so squeamish. In 1928 there was brought to light in Beisan, Palestine, site of the Biblical Beth-Shan, a well three thousand four hundred years old; and to this day wells are the marvel of tourists visiting Constantinople, although not many of them are in use. One of them is known as the Cistern of a Thousand and One Pillars. Its columns are of marble, and the place is as big as the Cathedral of Notre Dame in Paris. It ran dry long ago.

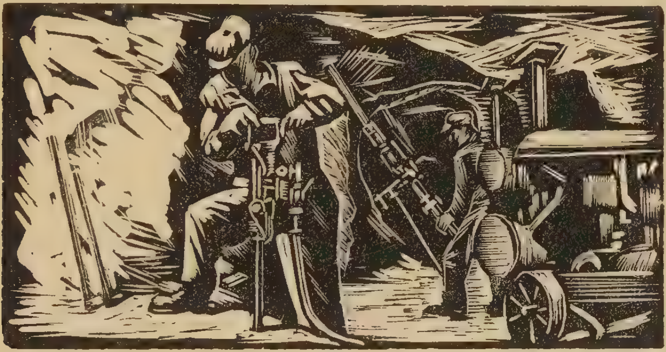
With the wonders of Roman aqueducts before our very eyes—

or before the eyes of readers—we in this United States were singularly backward in imitating them. Our most eminent thrifter, Benjamin Franklin, left a sum of money for the cities of Philadelphia and Boston; and as to Philadelphia he stipulated that at the end of the century—he died in 1790—the city was "to bring the waters of Wissahickon Creek into town so as to supply the inhabitants." He explained that by then the wells would begin to run dry. But Philadelphia stopped using well water somewhat before his bequest became operative.

New York began her first aqueduct in 1842—using aqueduct in its customary restricted meaning—and Baltimore followed in 1850. Probably Los Angeles has surpassed us all in spectacular efforts to provide an abundance of water for drinking and bathing, and as a protection against fires. She draws a maximum of two hundred and fifty million gallons daily a distance of two hundred and thirty-five miles, across the Mohave Desert, through mountains and over valleys, and develops incidentally one hundred and twenty thousand hydroelectric horsepower. This was completed in 1913, and San Francisco's Hetch Hetchy five years later. The city by the Golden Gate constructed an aqueduct one hundred and fifty miles long, with a maximum of four hundred million gallons a day, and expects to develop from it two hundred thousand horsepower. New York City's new Catskill aqueduct—the third to supply the needs of the five boroughs—carries half a billion gallons daily, and is ninety-two miles long. It runs from Ashokan reservoir, eleven hundred feet beneath the Hudson River near West Point, to the Kensico Reservoir thirty miles north of the city, where the water is aërated by machinery.

To carry New York's water supply to the consumer, it became necessary, as we have seen, to bore tunnels through solid rock five hundred feet beneath the city's surface. We need not wonder that the Romans, who knew nothing about electricity, hardly measured up to modern miracles, for electricity plays a big part in tunnel boring. Electric light bulbs are strung along the roof as the caves are pushed forward from vertical shafts sunk usually a mile apart; electricity discharges the dynamite blasts; an electric tank, in appearance like a dachshund, helps remove the débris, and electric "mules"—storage batteries—propel the little cars into which the tank dumps its scrappings. Then there are electric elevators to carry the blasted rock to the surface. Nor did the Roman know of pneumatic drills, or of compressed air to keep the tunnel free of fumes. But he did very well, thank you, with an abundance of slave labor.

For the most part, as a fact, Roman aqueducts ran above ground. Modern engineers lead Alpheus, the river god, far underneath the earth; and the engineering feat involved in the Catskill project, although it does not compare in length with similar undertakings in California (only Boston, whose Wachusett aqueduct is but seventy-eight miles long, has escaped the impost of greater distance), was declared by General Goethals to be more remarkable than the building of the Panama Canal.



Without such engineering feats, for our nourishment and refreshment in modern times, there "shall not a city be inhabited and men shall not sojourn or walk up and down therein"; for water, as I have said, contributes as vitally to our nourishment as does food. Meanwhile, what about cooking?

IV

In our own country we may observe the evolution of the culinary art since before the time when the stove and the oven came into use. The top of the cavernous Revolutionary fireplace was adorned with a row of horizontal metal plates, beneath each of which was a compartment for hot water, with a spout for emptying and filling it; there dishes were kept warm while others were cooking in pots suspended by a crane over the flames. There were toasters, and boat-shaped troughs wherein coffee could be ground with two-handled discs. And for pastries there were "goffering irons." These were stands bearing metal pods with removable discs, which could be heated in the coals; when replaced, they heated the metal so that pastry could be ironed over it. There were fluted pans and huge troughs wherein to knead bread, and tin contraptions, with shelves inside, which were set with their open sides toward the fire, to keep the food warm until needed. Such was the kitchen equipment of the Founding Fathers.

Mainly in the effort to show that the Founding Fathers were by no means abstemious as to drink, it has been revealed that they were by no means abstemious as to food. How their tables groaned! Not even Pepys in his diary described a greater lavishness. Quarters of mutton and legs of beef, whole hams, jellies and marmalades, potatoes and rice and carrots, several kinds of fish, corn bread and "light" bread, with tankards of ale and quarts of wine: one is amazed that the poor fellows survived.

To a regimen of this sort the United States stuck valiantly until within the last half century. Even before the Civil War M. Pierre Blot, an amiable and well-meaning Frenchman with a knowledge of good eating, came to this country to lecture us on the evils of our gastronomic ways. His intention was to introduce French methods of cookery, but he was rejected with contumely. American housewives continued to buy their frying pans, perhaps in more generous proportion, from itinerant salesmen; and to buy from peddlers also, often as not, hot corn, hominy, rolls, muffins, and sweets.

Table products were mostly local products in those days. They came from the garden and from near-by farms. New England clipper ships, to be sure, brought to the colonists teas from China, coffee and sugar and spices from Ceylon and Sumatra and the East Indies. Nowadays we find some of these things nearer at hand, coffee in South America, for example, and sugar in Cuba; and we consume them annually at an average rate per person of more than one hundred pounds of sugar, about twelve of coffee, and nearly one pound of tea.

The clipper ships were a product of tools and machines—for machines are but elaborated tools—but the carriers of to-day, many of them oil-burning, are more distinctly a product of the industrial era. So is the sugar, for that matter. Except for the fraction produced from cane in the Southern States, and from beets in some of the Western States, most of our sugar is ground in mills where grown, then shipped as the brown "raw" product to refineries here. Then it is put through cotton bags and through animal charcoal; it is boiled in huge vacuum pans and dried by a centrifugal process. Back of the loaf you drop into your morning cup lies a complicated machinery.

The mechanization of the food supply began on a small scale almost as soon as this country was settled. The Pilgrims had been at Plymouth but eight years when they set up a grist mill, and a water mill for grinding grain was erected by Endicott's colony at Dorchester in 1629. Boston was hardly a settlement before it had a tidewater grist mill. William Penn's colonists ground corn by machinery, and by 1700 there were many such plants in New Jersey, New Hampshire, and Maine. But the thing was not done on a large scale until after the Civil War. And our immense grain elevators, packing plants, flour mills, pickling and canning establishments, commercialized dairies with their mechanical cream separators and butter-makers, bakeries where the size of the loaf and the temperature of the oven are automatically regulated—all that vast spread of industry which makes possible the delicatessen dinner—are a growth of the last generation.

V

One gets a sense of the contrast with settler days in taking a look at the morning milk bottle. Back in 1602 we were making glass on this continent. Eight men were brought over for that purpose, Germans and Poles they were, and they worked near Jamestown. They made soap and tar, too, but the glass they made from Virginia sand and fluxed with potash from ashes. Mostly this went into beads for trading with the Indians; but we were exporting part of it to England ten years before the Pilgrim Fathers landed. Rude bottles were fashioned even then; but the bottle of to-day is made with soda-ash from Ohio, limestone from Michigan, feldspar from North Carolina, antimony from Utah, selenium from Montana, cobalt from Canada, and niter from Chile. Only the machine could make such an integration possible; only the machine could make possible such cheap and efficient containers.

Bread and milk are the staff and wine of daily sustenance. What, then, of bread? In ancient times wheat was reaped with sickles, and threshed by the trampling of animals on a floor of stone or hardened clay. The grain was not ground but pounded, and the chaff was blown away with fans. The Egyptians knew how to ferment their dough, once it was in preparation, but the poor ate mostly unleavened bread. The whole process was simple, and the tools were rudimentary.

To-day even the reaper drawn by horses in our western fields is a complicated machine, and the thresher is still more complicated. The grain is moved by truck or wagon to a railroad station, transported by steam power to Minneapolis, say, and there stored in a giant elevator equipped with belts, conveyors and powerful hoisting machines. It is graded by machinery, ground, bolted, and sacked by machinery; and when it reaches a modern bakery it goes into a loaf produced with the automatic precision of a Ford automobile. Even the measurement of materials to go into the bread is made "fool-proof"; in other words, it is done mechanically.

Bread-making has thus been taken out of the home. When we contrast the city apartment of to-day with the homes of our grandfathers, we begin to perceive that the economic emancipation of women is to a large extent a machine-made thing; and we begin to suspect that her political emancipation had somewhat the same origin. Back in 1840 women were employed in more than one hundred different occupations in the United States, but teaching was still the only occupation open to those who were educated. More of them would have taught school for a living if they had ever found time for an education, even of the elementary sort then required for pedagogy. As a fact the home of that day, and for a quarter of a century thereafter, exacted from its mistress such attentive drudgery that she had no leisure for the improvement of her mind, and was likely to forget such schooling as had been vouchsafed to her in girlhood.

Everything was done by hand. Benjamin Franklin, by growing the first broom-corn in this country, had lightened a little the labor of sweeping floors, and there was no problem of "hired help." Servants could be cheaply employed, but they required constant supervision, and the mistress of the household, what with the cleaning, the washing, the spinning, the mending, filling the oil lamps and polishing the chimneys, had her hands full. A mere inspection of the huge kitchen, where a cook might walk miles in preparing a dinner, and of the simple implements employed even after the coal or wood range came into use, will indicate how great was the labor of cookery.

Nowadays milady cleans the floors of her compact apartment—or has them cleaned—with an electric vacuum machine; laundering, if done at home—a rarity!—is facilitated by electric washing and ironing machines. Even the ice, likely as not, comes from an electric refrigerator. The kitchen has shrunk to a hole in the wall, and no more goes on there than behind the prescription counter of a drug store, where the pharmacist stands idle because machines are making his pills.

Thus feminine emancipation from political discrimination went along hand in hand with emancipation from domestic slavery. It is worth noting that American women, who may now vote, number about nine millions in industry, a large proportion of them tending machines. And if there is a servant "problem," its gravity is reduced by the slenderness of service to be performed.

A hotel publication estimates that Americans spend about four billion dollars a year on meals outside the home. There are no reliable statistics, and this guess may be as good as another. But the family which eats at home is not restricted as to diet to local or domestic products. Its oatcakes may come from Scotland and its oatmeal from Ireland. Denmark may send its liver paste and England its biscuit. Silver-skinned onions from Holland, frankfurters from Germany, anchovies from the Netherlands, caviar from Russia, almonds from Spain, cheese, truffles, and jam from France, and olive oil from Italy, are but a few items in the European bill of fare laid daily before the public of the United States.

VI

Not only has the machine made possible this wide and rapid interchange of food commodities: it has affected directly demand as well as distribution. There is marked evidence, for example, that we are becoming more vegetarian. Bernard Shaw may say that this is due to his precept and example, but the machine, liberating us from the barnyard, makes a somewhat better showing.

Even at our dinners and banquets it is no longer customary to serve more than one fish and one meat, instead of a variety of each as formerly. The gregarious rotarian tendency to gather about hotel tables, eat, smoke and listen with boredom to speakers, is one of the marked phenomena of modern life. The machine, by amplifying the speaker's voice, makes it impossible to escape that part of the function; but it does, by way of compensation, much to alleviate other rigors. Invisible fans suck out the smoke and vitiated atmosphere, while other fans pump in fresh air. Endless belts bear hot food from the kitchen below, and waiters serve first those farthest away, so that all may begin eating almost simultaneously. The procedure is strictly standardized, even to the dishes found acceptable to the greatest number of a large gathering. One New York hotel, recognizing our predilection for these affairs, has more than forty banquet halls and dining rooms and restaurants.

This multiplicity and variety of eating places under a single roof is hardly less remarkable than the multiplicity of our confectionaries. We spend four hundred millions a year for candy, three hundred millions for ice cream—both of them, incidentally, food products the preparation of which has been taken out of the home. Not even an exorbitant tariff on sugar serves to check the ravages of the American sweet tooth; not even the advice of physicians puts a damper on frozen confections. Our British cousins, attending a dinner of the American Society in London, marveled that we poured hot sauce over ice cream—but they admitted it was good!

VII

Now let us look at the other side of the dietetic shield. A British medical officer of the Indian Service, studying the effect of food on health, spent nine years in the remote Himalayas, among isolated races. He reported officially that these people were of magnificent physique, and that they preserved until late in life the characteristics of youth.

"I never saw a case of asthenic dyspepsia," he said, "nor of gastric or duodenal ulcer, of appendicitis, of mucous colitis, nor of cancer, although my list averaged over four hundred operations a year. While I cannot aver that all these maladies were unknown, I have the strongest reason for the assertion that they were remarkably infrequent. The occasions on which my attention was directed to the abdominal viscera of these people were of the rarest . . . for the relief of strangulated hernia," and so on. The doctor adds that the abdomens of these admirable tribes seemed insensitive to nerve impressions, to fatigue, anxiety, or cold. Their consciousness of that part of the anatomy was restricted to sensations of hunger.

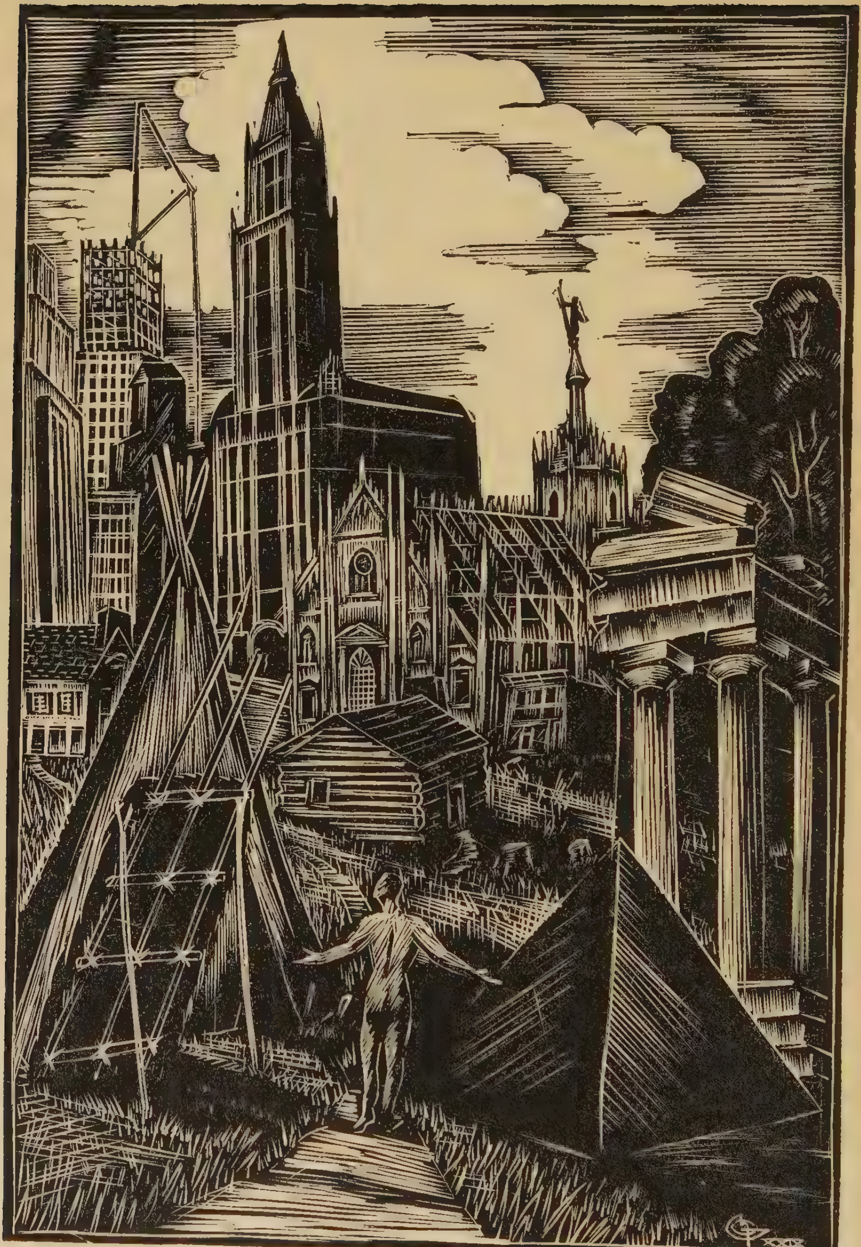
Compare that passage with the experience of your Tired Business Man, who seldom permits himself to find out what hunger is, who is constantly in a fret about his lower insides, and who seldom escapes medication or the knife. Before me as I write there lies a page advertisement of a digestive preparation which guarantees, by indirection, that those who devote themselves persistently and nobly to this remedy may with impunity snatch hasty lunches, eat midnight suppers, and attend such "parties" as they please. For civilization has not only brought us food which does not exercise our teeth and gums, and which lacks what the physiologists call roughage; it has imposed upon us also a speed which has made us neglectful of primary common sense about eating and drinking and exercising.

Those Himalayan mountain folk, it should be added, are not the only uncivilized people who are practically free from digestive diseases. Dr. Ernest H. Tipper, in *The Cradle of the World and Cancer*, tells of his observations during twenty years spent among the primitive peoples in the Nile Delta—quite a different environment. These are the two million inhabitants of Benin, West Africa; and Dr. Tipper says that in all his experience he saw only six cases of cancer, with only one of appendicitis, not clearly defined. The doleful truth is that wherever the white man with his "civilization" comes into contact with robust races such as these, the inevitable result is deterioration and degeneration. The observers whom I have quoted attribute this in large measure to the introduction of new dietary habits.

We are assured that the proper accessories of a full meal are abundant time, conversation, agreeable odors and—on occasion—good music. Above all, we are warned not to eat when excited or nervous. The Wall Street broker, hastily snatching his midday hot roast beef sandwich, is a fair example of what ought to be avoided, and by the same token offers a fair example of the sort of meal a machine civilization imposes.

Thirty years ago the broker's roast beef sandwich would have cost a quarter of a dollar; now it is more likely to cost him sixty cents or more. Fifteen years ago a T-bone steak for two could be purchased for thirty-five cents, although seventy-five must be paid for it now. The rise in the cost of food-stuffs, however, is no proof that mechanization of the food supply is to blame. Certain financial factors are involved which have no place in this discussion; and there is the added consideration that when the housewife steps around the corner for a bottle of pickles she expects to find on the counter just the brand and just the size she prefers, neatly done up. That sort of service costs money. It is a part of the complicated system of "distribution" which represents a fraction more than forty-nine cents of the consumer's dollar.

The machine, then, is sending more and more of us out of the home into restaurants, cafeterias, clubs, and hotels; it is making us soft and dyspeptic, hurried and worried. These are serious facts. Meanwhile the machine has given us a greater variety of food, a more sanitary supply, and far higher culinary standards. As for water, the gods sipping nectar on Olympus never quaffed a purer or more delicious drink than the stream which flows from city taps. If man has abused his food and drink, or has failed to take advantage of them as he might, surely he has himself in part to blame.


XXIX

CHAPTER THREE

SHELTER: From Bedouin's Tent to Woolworth Tower

I

YOUR Bedouin lived in a long "house of hair." It was not at all like the pictures one sees, for it was neither a hut nor a bell tent, of the kind which the owner may silently fold and as silently steal away. It was literally a house, some seven feet high—and therefore not high enough to be blown over by desert windstorms—with a sloping roof and an open front. Its material was woven of black goat's hair or reddish camel's hair, occasionally with horizontal white stripes. The pieces of stuff were two feet wide and from thirty to fifty feet long, sewed neatly together, supported usually by nine poles, and held in place by cords attached to pegs driven with a mallet into the sand. Even in rainy weather the interior was dry.

This was among the earliest human habitations to require the extensive use of tools and machinery. When man emerged from the cave—provided he lived in a cavernous country, unlike the desert—he learned to build a windbrake for the protection of himself and his fire by driving stakes into the ground and piling brush against them. Then he learned to pleat brush and grasses or reeds into a mat; from this to the roofed hut was but a step. Yet there are still, in this supposedly civilized world, folk who are homeless. The Tasmanians sleep in hollow trees, and other peoples live in trees or beneath them. Our own Red Indians built wigwams by erecting poles, bent inward at the top, in a circle, and covering them. The Algonquins used bark, the Sioux buffalo hides. The Iroquois sometimes built community dwellings five hundred feet long. But herdsmen, such as the Bedouins, were nomadic, and needed portable homes, so that they could move on to new grazing fields. They could not have learned to weave until they had domesticated animals to pluck or shear; yet the beginnings of spinning and weaving are lost in prehistoric mists. Pliny credits the invention of the hand loom gallantly to Semiramis, whose husband founded Nineveh and who, after his death, conquered all Asia save India. Nineveh existed at least four thousand five hundred years ago, and Pliny was writing some twenty centuries later; he may have been wrong about Semiramis. As for the loom, it is more than a tool, of course. Even in its simplest form it is a somewhat complicated machine. Yet the Arabs had the trick, and they had needles of bone or copper, with a coarse strong thread. The tribes still live mostly in tents, ranged along an impromptu street.

II

If it seems to us remarkable that the unlettered Bedouin knew how to weave fabrics, consider for a moment the Assyrians and Babylonians, who built homes and cities of brick, at first merely sun-dried, then baked in ovens. Those fellows knew the uses of wedges and cylinders, rollers, screws and turning lathes, pulleys, blow pipes, hand mills, windlasses, winches, leathern bellows, screw presses and of course the loom. With those tools, and horses to move girders from mill to building site, we could erect a modern office building, given time. Until we hit upon the steam engine in the second half of the Eighteenth Century, indeed, we were little ahead of these ancients in the way of tools and machines for building. They knew, undoubtedly, the principle of the lever, although Archimedes, who lived but two centuries before Christ, is commonly credited with the discovery. Archimedes, at that, probably deserves all the credit we can give him, and he may have rediscovered the lever. Occasionally important human possessions of that sort got lost in an era of constant savage warfare, and the summary destruction of whole cities, even the extermination of whole peoples.

Archimedes was a friend, perhaps a kinsman, of King Hiero of Syracuse, and he was the most celebrated geometrician of antiquity. More, he applied mathematical principles to mechanics, like any modern engineer. Once when the King had told a craftsman to make him a crown of pure gold, he suspected that baser metals had been worked into it, and directed Archimedes to find out whether this was true, but without injuring the coronet. For days the scientist pondered the problem. Then, as he got into an over-full bathtub—our own Cincinnati was rated a radical innovator when it introduced tubbing to this country—the water spilled over its sides. And suddenly it popped into the head of Archimedes that his body, in the water, weighed less by as much as the weight of the water that had slopped over onto the floor. Nude, he ran through the streets of Syracuse from the bath-house to his home, shouting exultantly: "Eureka, Eureka!"—I have found it. Thus he was able to tell the King just how much alloy there was in his crown, and wrote specific gravity into the scientific lexicon. Archimedes invented the water screw, which long preceded the pump, and he devised many other machines, including fire-throwing engines for warfare. He vowed that if he had a place to stand on he could move the world with a lever.

III

Nineveh and Tyre, and other cities of Northern Africa before the Egyptians began hewing stone, were of brick. In other countries, where stone lay plentifully about, tools were made of it. Obsidian was broken and shaped with clubs into knives, axes, chisels and borers. Not so very long ago a French scientist dug up in the Somme a short knife of polished stone which had been used, he decided from the set of the haft, as a razor. Fancy shaving with a stone razor! Perhaps not all our Neolithic ancestors were bearded, as we have been led to suppose.

Probably the first use of stones in any sort of construction came when they were piled above graves, as rude monuments, and then went into the making of altars. When it came to building, the difficulties of roofing were obvious. The simple and easy way was to set each stone so as to overhang a little the one beneath it, from which evolved the pyramidal form. The biggest of the pyramids erected by the Egyptians was of granite and limestone, some of which was brought from places five hundred miles up the Nile. Many of those stones weighed from forty to sixty tons each, and the total weight of one pyramid has been estimated at close to seven million tons. Herodotus says that one hundred thousand men spent twenty years building this magnificent tomb for the family of a Pharaoh.

Long before the pyramids were built, however, the workers with brick had learned the trick of overlapping them, and then had hit upon the arch, or vault. Nearly seven thousand years ago the Chaldeans built the earliest example of this we have found, beneath a terraced temple tower at Nippur. It was of burnt brick, cemented with clay mortar. The underground granaries of Rameses II at Thebes were twelve feet high, and were vaulted. Tarquin built the cloaca maxima at Rome, a tunnel eight hundred feet long, with a ten-foot span and thick walls to withstand the thrust, to drain the marshy ground between the Palatinate and Capitoline Hill. Ancient Roman and Chinese bridges were arches.

For all that, and in spite of their magnificent roads and aqueducts, the Romans lost many of the secrets of building with the help of machinery. With plenty of slaves at hand, why bother with mechanical horsepower, or the mechanical aids to human muscle? Free Romans looked down on manual labor. Slavery, then as always, was a brake on technical achievement. And the slaves lived within a stone's throw of their masters' magnificence. Nero's Palace of Gold rose almost beside their barracks.

IV

In the Middle Ages, it is safe to say, people were less comfortably housed in Europe than were the Babylonians and Assyrians, thousands of years before. Constructive effort was concentrated on splendid cathedrals, with groined and vaulted ceilings. The buttress, to help withstand the thrust of these arches, was developed; and the stone masons who built them worked on the spot, watching the great and beautiful temple as it reared itself skyward. That was the age of the guild. The designers and craftsmen, the skilled workers in metal and wood and glass, were on the ground. Windows were fashioned and put into place, doors were built and hung, stone was heaped on stone, by artificers who saw their handiwork fall into a beautiful design, and experienced a proud partnership in the whole enterprise. Even the metal hinges of the massive doors became, in such circumstances, things of art.

These expressions in stone of a community's piety dominated squat towns in which the dwellings of princes and nobles were dark, with tiny bedrooms and crooked passages. Prosperous burghers lived in wooden houses thatched with straw or roofed with shingles, and disastrous fires were frequent. More impressive places of abode were to follow; but the old German and French and English and Scottish castles, despite their imposing exteriors, can hardly be compared in comfort and convenience with a Bronx apartment.

All but unheated they were in winter, these old castles. Even the Romans, many centuries before, had learned the virtues of separate heating plants, and piped hot air to radiators in their homes. But that expedient, not uncommon to this day in temperate-zone dwellings, seems to have been forgotten or ignored in the Middle Ages. It is true that men had learned to build chimneys, and no longer let the smoke from their fires escape through a hole in the roof, or find its way as best it could through an aperture in the side of the structure. But they had open fireplaces, which are notorious for scorching you on one side while you freeze on the other. When the silken courtiers of Louis XVI were making merry on wealth wrung from the peasantry, the peasants themselves were trying to keep warm beside braziers of smoldering charcoal. The stove was to come later.

Open fireplaces persisted in the shelters erected by our own pioneers, as they pushed forward to the conquest of the West. They built cabins of solid logs hewed square, and the raising of the roof-tree was a community event, providing there were neighbors within, say, a score of miles. (A radius of some such length was often required if one was to use the word community.) Whether to build a log cabin or a sod house (such as may still be seen in parts of Kansas, Colorado, Oklahoma and Texas), fight a fire, or repel Indian raiders, the pioneers, bound by a common peril and a common welfare, stood together. From the log cabins, not unlike those occupied by the peasantry in certain parts of Russia, a distinctive type might have been developed, had its owners been willing to stay put. But the pioneer was ever restlessly on the move. Hardly had he subdued the forest about him before he began to hunger for scenes further west.

V

We are a young country. The traces of that pioneer life have not vanished to this day. William James tells of a journey he made through the mountains of North Carolina, and of the settler clearings he saw there, at the heads of little valleys between the hills—spots called "coves." The smaller trees had been cut down, and their charred stumps left standing. The larger trees had been girdled and killed, that their foliage might not cast a shade. At the center stood a rough log cabin, its chinks stopped with clay; and around it was a zigzag rail fence, to keep out the poultry and pigs which fed in the woods near by. Between the blackened tree stumps, Indian corn had been planted in irregular rows; and there the squatter, with his wife and children, an ax, a gun, and a few cooking utensils, lived.

To William James such places, defacing the majesty of the forest, seemed at first like ulcers, with nothing to make up for the loss of natural beauty. He asked the man who was driving him what sort of people made these clearings. "All of us," the man replied; "why, we ain't happy here unless we are getting one of these coves under cultivation." And suddenly the philosopher awoke to the inward significance of those clearings, each charred stump representing a personal victory, the chips and rails speaking of sweat and final reward, the log cabin an emblem of security and shelter for wife and children. They sang a pæan, James declared, of duty, struggle, and success.

If those log cabins did not flower into a distinctive American expression, the homes of the New England countryside, from which many of the pioneers set forth, did. The white farm houses of the northeastern United States, constructed by carpenter-architects, had a character of their own, and were snug against bleak winters. Many of them contain fine examples of the woodworker's art, and all the older dwellings bespeak what was soon to become obsolescent, the craftsman's pride in his work. The change which was to put craftsmanship to rout was foreshadowed even at the middle of the last century, when the Smithsonian Institution was being planned in Washington. Robert Dale Owen, a former member of Congress and a social reformer, observed that the products of the mine were encroaching on the usual building materials. "The next generation," he said, "may see, arising on our continent, villages, or it may be cities, of iron."

The utterance was prophetic. Yet the Romans and Greeks had secured the stones with which their buildings were faced with bars of metal, almost as we do now in our skyscrapers. They did that, and we knew it, and yet our builders strangely ignored the lesson. Toward the end of the Nineteenth Century a French gardener named Joseph Monier began making water basins by pouring concrete around a network of iron rods, and until very recently that gardener has been credited with having originated the idea of reinforced concrete. Not until the summer of 1928 was the claim disputed. Then it was discovered that in 1853, fifteen years before Monier made the first of his strengthened water basins, a Jesuit priest in New Orleans had anticipated him. A church on Baronne Street, built in that year, was demolished. It had been erected on land reclaimed from a cypress swamp; and when it was torn down, the construction of its foundation walls stood bare. The priest, acting as his own architect, had poured a concrete of crushed oyster shells and bricks around strong iron bars, running from top to bottom of the walls, and held in place with wrought-iron hoops. The Reverend Father Cambiaso apparently thought very little of his revolutionary idea. He left no written record of it. Yet that idea is fundamental to the modern skyscraper.

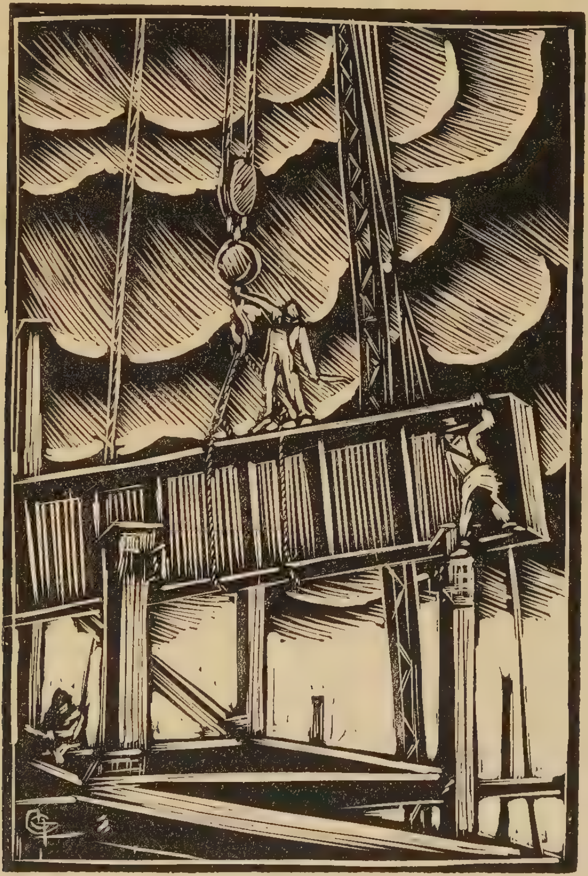
VI

Half a century ago we called ten-story buildings tall. The Monadnock in Chicago was built without steel reinforcement, and is still standing as this is written. To support walls of that height the masonry was necessarily of such thickness at its base that windows pierced through it were almost valueless, and would have been quite useless had the masonry been much deeper. Thus there was an automatic check on the height to which such structures could be pushed.

Back in 1926 there was demolished at 50 Broadway in New York City a structure which was the first in this city to make use of metal reinforcement. It was called the Tower Building, although it was but ten stories high; and its first six stories, as a fact, were not reinforced at all. On the top of these walls of masonry was erected an iron skeleton, to serve as a framework for the upper four stories. The Tower Building was a modest harbinger of Manhattan's jagged skyline. It was the first move in a structural revolution. It was the grand-daddy of the seventy-five-story office building with which Chicago would challenge the heavens.

Chicago, indeed, was the parent of the skyscraper. In that restless, up-and-coming city by the lake there was erected in 1884, five years ahead of the Tower Building in New York, a ten-story structure at LaSalle and Adams Street which was the true ancestor of this Gargantuan progeny. Until 1893 Trinity Church steeple was the highest point in lower Manhattan; then it surrendered its dizzy eminence to a seventeen-story insurance building.

Shelter is a main activity of this country. By the end of the first quarter of the twentieth century we were spending six billions a year on it. Our greatest builders complained that the industry was almost as ill-organized as coal-mining and agriculture, subject to devastating competition and crippled by inter-union jurisdictional disputes; but the fact remained for all that of our quantitative—if not qualitative—mastery in the field. We are the world's greatest, most feverish, most ingenious builders.



The American frontier disappeared, it is agreed, about 1890. The West had been conquered; there was no longer a rush to settle Government lands; trusts were being formed, railways merged into vast systems, steel and oil plants consolidated. Giant mushroom factories sprang up in our urban centers, and their demand for labor brought such congestion of population that land values soared. Taller and taller buildings were needed if rentals were to be obtained that would justify investment in building sites; and to meet this situation, either providentially or because in some obscure way man does meet the emergencies which confront him, the steel skeleton building, with brick and stone and tile as a veneer—not the true substance of the building itself—made possible taller and taller buildings. Engineers now assert that there is virtually no theoretic limit on the height of the set-back, pyramidal skyscraper, provided the base be broad enough. But in practice there is a limitation, just as there was a limitation on unsupported masonry. It is set by the elevator.

The taller the building, the greater must be the number of elevators to accommodate the tenants; and where ground rentals are enormous, the space given over to elevators becomes an item of moment. In cities of a million, say, it is calculated that the twenty-story building is about as high as can be economically constructed. Where land values are abnormal, or where there is exceptional advertising value in mere height, more stories may be justified. Detroit, Chicago and New York, for example, have competed for more than a decade as to which should have the tallest building, or the building with the greatest floor space. It was a competition in advertising; and we may realize its justification when we reflect that the names of the Flatiron Building and the Woolworth Tower are now household words in America. The Flatiron Building became famous, to be sure, partly by reason of its singular shape and floor plan. The Woolworth Building, with a daylight population of more than ten thousand, became famous not only because, when it was built, it was the highest in the world, but because of the rare beauty of its lacy tower.

VII

Once the architect has drawn his plans, the building of a modern skyscraper becomes a standardized, mechanical, almost automatic process. Every I-beam is numbered and put neatly into its appointed place. The structural steel worker, as he stands on a rib of the skeleton and catches in a bucket red-hot rivets tossed to him from far below, glories, not in craftsmanship, but in his personal nerve and daring. The carpenters' union quarrels bitterly with the metal workers' union as to which shall set the window frames and sashes, which are of metal. The workman contributes to the thing no individuality and no art. The transfer from the ancient guild to the modern labor union meant a transfer from pride in manual achievement to pride in the wage scale.

Since the skyscraper cannot be built profitably except upon land of abnormal value, and since the plans and equipment of such buildings are changing constantly, we have learned to construct them rapidly and cheaply; rapidly, because while the land is out of use enormous charges are piling up to be amortized by rentals; cheaply, because new types of elevators, new arrangements of office suites, new uses of metals and tiles, swiftly outmode them. It is said that New York is wrecked every twenty-five years, to be built anew. The saying, as applied to skyscrapers, is almost as accurate as it is striking. True, there are some modern office buildings and apartment hotels that have the prospect of standing more than a quarter century; there are others which certainly are not expected to stand so long. The average is fair. "Build me," Douglas Robinson once instructed a contractor, "the cheapest thing that will hold together fifteen years." Yet the buildings went higher and higher. School children, who have been taught that any hill one thousand feet or more in height is a mountain, according to the official designation, might be expected to marvel at the structures projected, as this is written, for New York City; for two of them at least are intended to rise above mountain-height. Yet a blasé public took them rather as a matter of course. During the sixteen years that the Woolworth Tower held the palm for altitude in this country, the neck-craning habit had been somewhat curbed. That such buildings were to cost thirty-odd million dollars was accounted, apparently, more interesting than the fact that they were to rise seventy-five or eighty stories above the ground. That jewel of architecture, the Taj Mahal, is supposed to have cost only ten millions, but slave labor was employed and the materials came mostly from the royal territories. The Capitol in Washington is valued now at more than one hundred millions, and the White House at more than twenty millions. The former is the most costly building in the United States, and the latter the most expensive residence.

As for the commercial skyscraper, Douglas Robinson's method appears still to predominate. The cubic foot is the basis of value, not length of life. It would seem that only libraries, churches, and country mansions are being built to endure; and some churches are "progressing" to the skyscraper style.

VIII

Once the erection of a skyscraper ceased to astonish the urban American public, architects began to think of difficult feats for the builder to perform. Certain structures in Manhattan, which I happen to have seen in the process of construction, will serve to illustrate what I mean. One of them is the Paramount Building at Forty-second Street and Seventh Avenue, where an enormous auditorium without columns was to be provided. To do this necessitated lifting eight steel ceiling trusses, each weighing one hundred and forty-four tons. Not even the Egyptians had tackled a task so colossal as that! Each truss had to be lifted one hundred and twenty feet from the sidewalk, to a point corresponding with the eighth floor, and set upon steel columns, each weighing some fifty-five tons.

Now, if you could get together a group of men each of whom could lift three hundred pounds over stretches of hours, it would take a regiment one thousand strong to budge one of those trusses. But modern man does not employ mere muscle for such exploits. In this case a traveling crane weighing two hundred and twenty-six tons, with two derricks each weighing seventy-five tons, and two fifteen-ton engines to manipulate the derricks, were set in place. Fifteen steel rails were grouted into solid rock, and on them steel rollers were laid transversely. When one truss was in place, the crane rolled forward impassively to lift the next. Here you had a modern Hercules, with steam in his nostrils and steel in his muscles, standing eighty-four feet tall in his own right, with a boom or arm seventy-five feet long, his hands metal blocks with eight sheaves and fifteen fingers of steel rope. You had in effect a seven-story moving platform on which were derricks and steam engines.

Thus an immense load was lifted eight stories into the air in twenty minutes.

In Madison Square Garden a longer span had to be roofed, but it was not necessary to build so stoutly. The width there was two hundred feet, and each of the twenty trusses weighed sixty-eight tons. At the Level Club the auditorium was planned to occupy the fourth floor, with twelve floors above it; and the trusses were ninety-two feet long, each weighing one hundred and thirty-five tons. Per linear foot these were the heaviest beams ever utilized in shelter for man, up to that time; although heavier trusses had been put into the Hell Gate Bridge. In Mecca Temple a domed roof, with a diameter of one hundred and eight feet, posed some new problems. Each time the contractor and engineer grinned; each time they found a way.

Municipal zoning and building restrictions, limiting the character of structures and the height to which they may rise vertically from the ground, brought the set-back building and a partial reversion to the pyramid style of the Egyptians. Mere novice laymen like myself may look in admiration and awe upon these receding towers as they pierce the upper atmospheres, but the highbrows will tell you that they are nothing to boast of. Why, they ask, make a virtue of necessity? The architect and builder deserve no credit; they did merely what the law forced them to do. To me this seems a little niggling. It abates not one jot my pleasure in craning my neck to stare at one of these giants.

Skyscrapers are not the be-all and the end-all of American building. Back in the middle of the Nineteenth Century New

York, imitating London, built herself a Crystal Palace, whereby her engineers learned some new tricks with glass and steel, visible to this day in our vast terminal train sheds. And the World's Columbian Exposition in Chicago toward the end of that century, with its stucco and Venetian Gothic façades, absorbed Henry Adams for a fortnight. "As a scenic display," he said, "Paris had never approached it, but the inconceivable scenic display consisted in its being there at all—more surprising, as it was, than anything else on the continent, Niagara Falls, the Yellowstone Geysers, and the whole railway system thrown in, since these were but the natural products in their place; while, since Noah's Ark, no such Babel of loose and ill-joined, such vague and ill-defined and unrelated thoughts and half-thoughts and experimental outcries as the Exposition, had ever ruffled the surface of the Lakes." Adams did not give the Exposition credit, as others did, for inaugurating the widespread reforms in city planning which followed it.

IX

But in the effect on the standards of workingmen and the social life of the community, such experiments as that could have no influence comparable with the influence of reinforced concrete and steel skeletons cloaked with stone or brick or tile. (Tile for decorative purposes was sometimes baked at a temperature of 2,400 degrees.) Even prior to these innovations some of our cities, notably Philadelphia and St. Louis, had ventured on the two-family and four-family dwelling; it meant an economy in space, materials, and heating plant. So far as heating was concerned, the ingenious Yankee had rediscovered, even before the Civil War, the value of a central plant, and thus unconsciously had emulated ancient Rome. But with modern uses of metals and the advent of modern mechanized construction, the city dwelling became, in most instances, only part of an immense warren.

After the World War, which put a temporary halt to dispensable construction and vastly augmented urban congestion, rentals rose until they absorbed, not one-fourth of income, as domestic economy prescribes, but in many cases one-half or more. The result was to squeeze the family into narrower and narrower quarters, and to attenuate the home, presumably a foundation stone of our United States, into the mere wraith of itself. Scientists declared that we were bound hotfoot for the demnition bow-wows. Learned societies speculated on the mental, social, and spiritual depravity which must result from that way of living. Richly endowed and idle foundations conducted surveys to determine just what were the consequences of an industrial era that had produced skyscraper dwellings, along with the fortunes with which the foundations were endowed. There were even those who blamed on the skyscraper apartment the cocktail hour, the short skirt, shingled hair, and the public use of the lipstick.

Cramped living quarters did have one effect, which seems to have been rather neglected in discussing them, that of putting the family library almost out of business. There was no longer adequate space for bookshelves, and people got out of the habit of buying volumes to keep by them and mull over in leisure hours. The circulating and public libraries had to serve the community's need, in large measure. I do not associate the absence of good books necessarily with the beauty parlor or the motion picture palace, but every one will agree, I think, that the absence is regrettable.

Of course the dining room disappeared. How was one who could hardly afford the necessary bed chambers, to rent a room that would be used only two or three hours in the twenty-four? And the kitchen, which soon shrank to a mere hole in the wall, is now obsolescent in our cities. The National Homemakers Council is prophesying that stoves will soon be extinct and that urbanites will be ordering their meals—as they now, some of them, order their steam heat, from corporations which pipe it out of a central plant—from community kitchens. It is not an appetizing prospect. Tepid soups, standardized salads, and vegetables, medium-seasoned roasts and desserts to satisfy Mr. Average Man are not especially alluring. But the irony of the situation is that, amid the exiguity of the modern apartment, we actually haven't space for the very machines which we have devised to increase our comfort and the convenience of our dwellings.

Will the living room go next? If it does, then what we used to call home will become merely a port of evening call, with a cubby hole where we may hang up our clothes for a few hours and find the necessary sleep. That would seem to be in the logical order of evolution, but it is a more pessimistic picture, I suspect, than is justified.

Whether or not the facts be regarded as untoward, more and more families are living in the rabbit warrens we call apartment houses. In New York and Chicago about two-thirds of the new residence construction is of this type, and in two hundred and fifty-seven cities more than half, as against one-fourth in 1921. Dwellers in such places move readily and rapidly, some of them annually. The convenience of the apartment home is making us a race of nomads; it constitutes a striking repudiation of the country tradition, where families live generation after generation in the same county or on the same site. It is therefore strictly an urban phenomenon, but it is spreading swiftly to suburbs and to smaller cities well away from the great centers of population.

X

There has been a social evolution to which little attention seems to have been paid. Débutantes are now introduced to society more often than not in our luxurious hotels, and fashionable dinner-dances are given at swagger restaurants. The parents of these young folk would have deemed it humiliating to leave their own homes for such functions. The mothers made their bows in spacious drawing rooms, and there was room for forty or fifty guests in the dining rooms of their homes. Now, in the span of a generation, that family, whether nouveau riche or old and well-to-do, finds itself as a rule housed in a duplex or triplex apartment, which in turn is one of perhaps half a hundred such apartments in a single towering building; and although its quarters give an air of amplitude, they are not in fact planned to accommodate a host of guests. Their air of space is factitious. And so it has come about that resort to huge caravansaries and hired waiters in restaurants is no longer regarded as bad form.

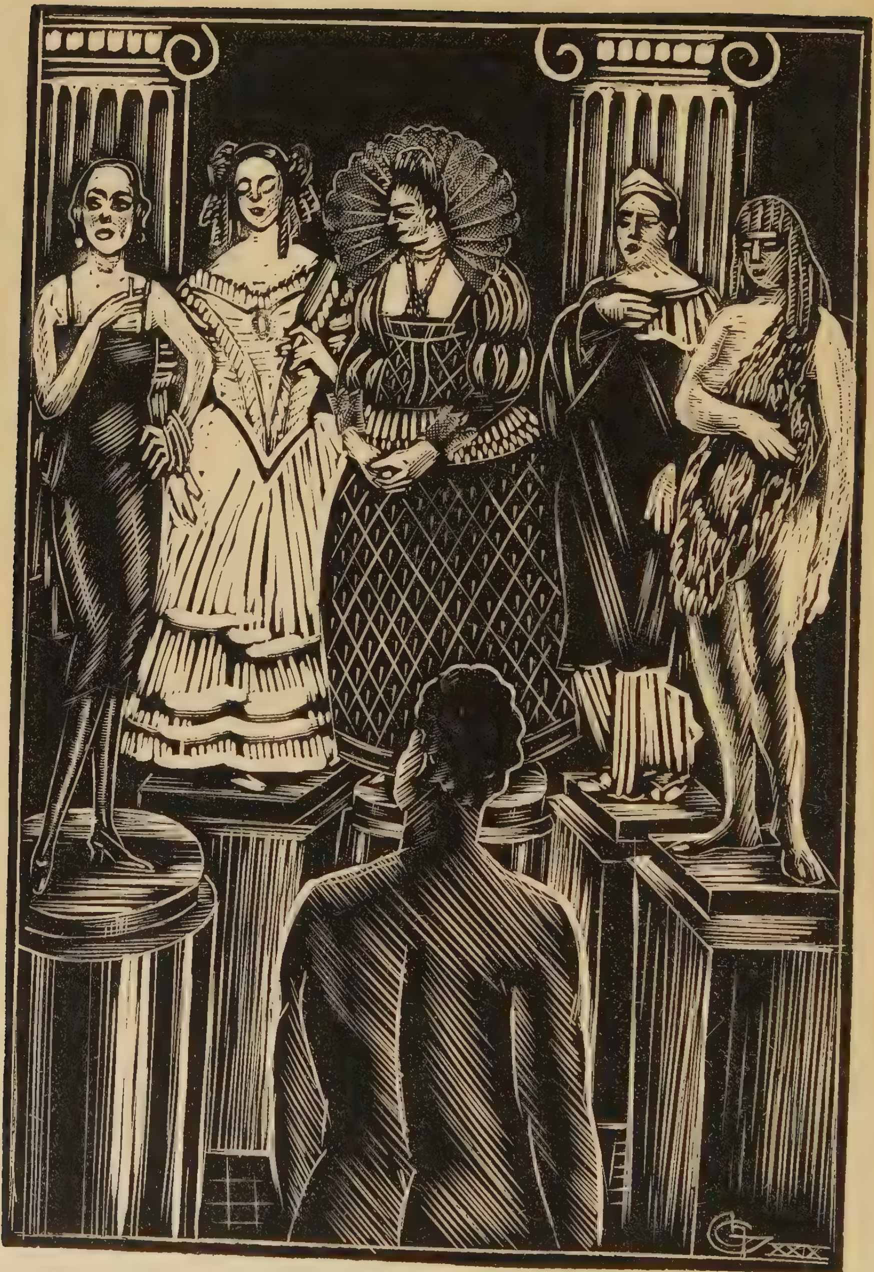
What would Thomas Jefferson, who designed and built Monticello, think of our modern cubby-hole homes? Elwood P. Cubberly has answered, not this question but another related to it. The routine of life did not greatly change between the time of Jefferson and of Lincoln; and Professor Cubberly has told us what Lincoln might think if he were to return to-day to the nation's capital, and walk again her streets. He would be bewildered by structures more than four stories high, by plate-glass windows in the shops, by electric street lighting, by the elevators, by sanitary plumbing and steam heating. In his day plumbing was rudimentary, gas-jets and coal-oil lamps were just coming into use, and plate glass was still unknown. The economic revolution was to flower during the next two decades. The United States Industrial Commission observed in 1902 that "the changes and the progress since 1865 have been greater in many directions than during the whole history of the world before." It was more than an economic revolution, to be sure; for it meant the revolutionizing of agriculture, manufacturing and society itself. Henry Ward Beecher seemed to sense what was coming. As early as 1871 he said:

"We are to-day in more danger from overgrown pecuniary interests—from organized money—than we ever were from slavery, and the battle of the future is to be one of gold and silver."

Possibly the famous pulpit orator merely set himself up, when he said that, as a kind of male Cassandra. There is no denying the dangers of "organized money," or, on the other hand, of the creature comforts and cultural opportunities that it makes possible. What has happened during the evolution of man's struggle for shelter has been but sketched here. Yet its influences ramify in many directions.

Back in 1833 the bureau chief in charge of the Patent Office in Washington tendered his resignation. There was no longer any need of his services, he observed sadly: man's ingenuity had been exhausted! In less than a century since then man's ingenuity, merely in the matter of machines for making building material and erecting skyscraping shelters, has had the very flavor of necromancy. Has the pendulum reached the peak of its swing? Is this busy and restless people about to pause, now, and take stock of its achievements, with a view to remedying the defects of a machine age, and capitalizing its virtues?

There are those who believe that the second quarter of the Twentieth Century will witness the beginning of just such an era.


XXIX

CHAPTER FOUR

CLOTHES: From Hides to Rayon

I

ONCE men were the strutting pouter pigeons of the world. A French count of the elder day, before destroying himself, scribbled a brief and bitter explanation: "Tired of dressing and undressing." The Machine Age appears to have no monopoly of boredom. But to-day it is the women who spend the more time dressing and undressing; they are the peacocks of modern civilization. At any function the most jaded eye must delight in the variety, the brilliance and the coloring of their costumes. At the Court of St. James's, Queen Mary the conservative has even approved of presentation gowns sprayed with liquid gold. (Not even the Chaldeans of Ur, with their wigs of gold, had anything on that!) One of the model gowns submitted for the inspection of guests invited to a royal reception bore three hundred dollars' worth of the metal, worked into taffeta and satin until the garment glowed like a polished coat of armor, yet draped as gracefully as silk. And there were other gowns in the Lord Chamberlain's office made of parchment lace, still others richly embroidered. Their cost ran as high as two thousand dollars each. But that was as far as the Queen would go. The train must not be more than eighteen inches long, and the wearer's arms must not be entirely bare. Certain restrictions were set on the feminine peacocks.

But mere man had to wear the stereotyped and stupid swallowtail.

Soon after this country was signalizing the Machine Age by building Lowell, Massachusetts, its first strictly industrial city, Benjamin Disraeli set out on a long journey. This was in 1832, five years before he entered Parliament, when Victoria had ascended the throne. The ladies of England were notoriously dowdy then, but we read in André Maurois' biography that the traveler astonished the officers at Gibraltar by the variety and brilliance of his waistcoat buttons, and appeared in Malta wearing an embroidered Andulasian jacket, white trousers, and a sash of rainbow colors. That, however, was but a preliminary. The young Englishman left Malta in the garb of a Greek pirate, with a blood-red shirt, silver buttons as large as shillings, a sash stuffed with pistols and daggers, a red cap, red slippers, and wide sky-blue trousers! A singular and heartening adventure, it must seem to us of this day, for a future Prime Minister to whose funeral his Queen sent primroses.

II

Meanwhile, in this country, the tendency was steadily toward a public temper that would have been shocked beyond measure, had Disraeli ventured in this direction, at his gay and defiant gesture. From the graceful crinolines and hoop skirts of Revolutionary days our women descended to the bustle, the wasp waist, and mutton sleeves. Our men discarded their starched and ruffled linen stocks for mass-production collars, and found themselves presently in a uniform silly enough during the day, a little sillier at dinner, and silliest of all at formal evening affairs.

This thing of putting men into peace-time uniforms is a part of processes which are extending, oddly, throughout the civilized world, and they are machine processes. The Founding Fathers would be amazed, and disgusted, I have no doubt, if they knew that Americans wore clothes made of wool grown in Montana or Australia, woven in New Jersey, fashioned in Chicago or Rochester, and distributed in cities large and small. The factory age has not only standardized its product but has integrated industry on a vast scale.

On an average the clothes worn by men weigh about fifteen pounds, and the manufacturers of textiles, abetted by dressmakers and shops, attempted in the Winter of 1929-30 to induce all women to return to garments that weighed as much or a little more, instead of weighing about one-tenth as much, as they did during the day of the short skirt. Parisian *couturières* declared that the new styles would give greater play for women's individuality, and free them from the styles which followed the World War, but which the experts asserted were a product of the Machine Age. The result was a pronounced sales resistance, and an injury to the trade. There was an actual tendency toward the assertion of independence by those who had long been regarded as the most docile and biddable of creatures.

Why those women who meekly obeyed the new orders did so, and began lugging around fifteen pounds or more of clothes, was not clear. Men, who are more conventional than women in this field, dwell in an enervating self-imposed semi-tropical climate both in Summer and in Winter, whereas woman, in her day of enlightenment, lived in a stimulating and invigorating sartorial climate. The temperature within the man's garments was about 88 degrees, while it was only 80 in women's; and the respective humidities were 70 and 55.

Working girls spend about one-fourth of their wages on clothes. The more they earn, the smaller the proportion of their income for personal adornment. When I say that men are more conventional about what they wear, I do not mean to say that the matter is more important to them, but merely that they are more generally conforming. To the feminine mind, it must be admitted, the thought of rebellion against radical changes in styles (of course we must distinguish between a mere style of dress and a new fashion, which has wide approval), was not to be either lightly dismissed or accepted.

American styles and fashions have their influence around the world. One of our department stores advertises that it sends rompers to Jerusalem, collars to Brazil, stockings and scarfs to Canada, sweaters to China, nurses' uniforms to England, coats to Japan, dresses to Poland, pajamas to Switzerland, hats to Trinidad, shoes to the Virgin Isles and underthings to Venezuela.

Observe, if you please, some of the consequences. Upon the streets of nearly any American city one may see Chinese in the togs we hold to be decorous. In Paris and London one may see Zulu chiefs in top hats, sheiks in derbies, Indian rajas in fedoras. The extension of standardization seems to go first to the head. Kemal Pasha has sternly forbidden Turkish women in Government employ to wear the scarf, asserting with asperity that it is a relic of the veil. King Amanullah of Afghanistan, when he attempted to introduce European and American habits of dress, aroused a revolution. Shah Reza Khan of Persia made the wearing of "modern" hats compulsory, and had a rebellion on his hands. At the outer ramparts of the world, it seems, the flame of individualism still burns bright.

III

Nine years after George III ascended the British throne an ingenious English barber patented a device which constituted man's first forward stride, for some six thousand years, in the manufacture of textiles. The barber's name was Richard Arkwright, and he was knighted for his service to industry. His device was the cotton-spinning frame; and in this country George Washington lived to see a water-driven cotton mill. In less than a quarter of a century Eli Whitney invented the cotton gin. He did not patent it, for his model was stolen from his shop and put promptly to use; robbed thus of his inventor's profits, he made a fortune in the manufacture of firearms. Then, in 1846, Elias Howe patented the sewing machine. A mechanized revolution in dress was well under way.

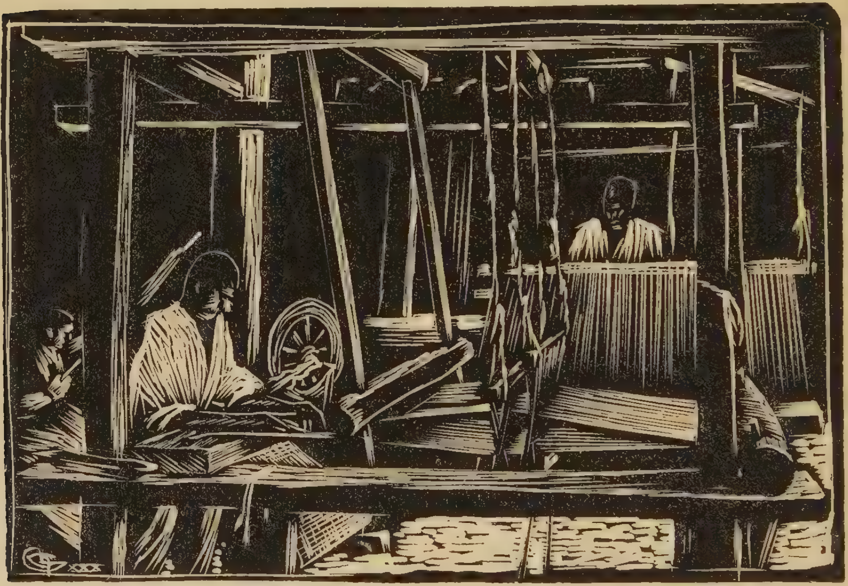
It was a revolution, not in the fabric but in the method of fabrication. Men and women have never attired themselves in more exquisite raiment than the Arabs of Damascus and Bagdad wove in the Tenth Century. They knew also the secrets of dyeing. Thatcher and Schwill tell us in their *General History of Europe* that these people "outdid the world in the variety and beauty of design and perfection of workmanship." One doubts whether they outdid the Sumerians, who preceded them by four millenniums. In the graveyard of the Moon God at Ur, in 1928, archeologists unearthed the tomb of King Mex-Kelan-dug, who died some two thousand years before Tut-ankh-Amen; and there they found wigs and beards of gold, the hair delicately engraved; yea, wigs of gold, instead of the modern toupee, which deceives nobody. Into Queen Shub-ad's gorgeous gown were woven flowers and coronets and gems. Primarily a matter of décor, clothes have arrived in modern times at no greater beauty than of old.

Hendrik Van Loon, who in *Man the Miracle Maker* treats of clothes in the same chapter with houses, as though they were merely designed for shelter, might deny, if he gave the matter any thought, that garments were originally devised for decorative purposes. And it is probably true that primitive Esquimaux and Scandinavians began using furs as an armor against the elements, wherein Milady wearing chinchilla to the Opera amusingly imitates them; but in the tropics, where the human race originated, clothes were hit upon, undoubtedly, as ornaments for the body; and so, according to the Whistlerian dogma that the function of art is to improve on nature, they must have been man's earliest artistic expression.

Nor were clothes adopted because of modesty. Modesty was not a cause but a consequence of clothes. Xenophon contemptuously attributed the downfall of the Persians to the fact that they covered even their hands and arms in winter. To him clothes, or too much of them, smacked of effeminacy. Elsewhere they were sometimes regarded as immoral. Indians whom the Spaniards found on the Orinoco, Fritsch tells us in *Clothing and Morality*, were ashamed of garments and refused to wear them; but they blushed at appearing unpainted before strangers.

IV

Paint was indeed an early method of decorating the body, not only in South America but among our Red Indians, the primitive peoples of England and elsewhere. Certain tribes smeared their bodies with grease, like any modern Channel swimmer, but for a different reason. Some tribes, in a comparatively high state of culture, still dispense altogether with apparel: Australian Bushmen, Andaman Islanders, the Dyak races in Borneo, the Eastern Islanders and other Oceanians. Franz Müller-Lyar, in his *History of Social Development*, reminds us that the Queen of the Balonda, when she gave audience to Livingstone, was absolutely nude. I do not doubt that the explorer was more embarrassed than she was. She had not been corrupted by civilization.



In his earlier life, then, man tattooed and painted his body. Then he began to employ tools, to scrape the fat from the inside of skins, and fastened them about his shoulders with thongs. He began to pleat grasses, leaves, and bark. Although it was much later that he began to use manufactured goods, we do not know when this was; from the bark of lime trees, cotton, and flax, he fashioned materials before the dawn of history. We know that the Assyrians wore long, snug coats, the Egyptians waist cloths, the Medes and Persians breeches. (Charlemagne's trousers were hip-high hose, one for each leg. The Middle Ages, indeed, were quite backward in the matter of clothes; the owner of two shirts was regarded as a wealthy man, while the vulgar herd had none.) The Greeks and Romans affected draped garments, the tunic and the toga, which were developed from the shawl.

But in those days there was no such thing as fashion. There was a difference between the attire of classes, but each class wore similar garments for centuries. The native costume of Japan has suffered little change in generations. I remember having seen, at a formal ball in New York City, a Japanese girl in the toilette of her country doing the fox trot, and wondered how she could dance backward and still keep on her sandals, which were held in place precariously, it seemed to me, by a single thong between the great toe and the next. Of course she did it automatically, and probably was quite unconscious of her footwear. We adapt ourselves to the most preposterous garments. William James says they become a part of our personality.

Until the Eleventh Century women generally draped their things about them. Then they began fitting their clothes about their bosoms and hips; but not until the Fifteenth Century was the button, that indispensable nuisance, invented and manufactured. In time it brought the narrow and complex apparel of to-day, although the Twentieth Century woman has all but dispensed with it. As for fashion, the automatic machine was needed to develop it to the full, and the editor of the *Dry Goods Economist* has called it "the greatest guessing game in the world." Let us look at its development in England, for we can trace its changes more satisfactorily there than in our own country. The population of North America effected a somewhat abrupt transition from feathers, moccasins and skins to colonial homespun and silken knee breeches. In England the process was slower, and freer from outside influences, although the Roman and Norman conquests had their effect on it.

The early Briton wore trousers, a tunic and a sagum, or short cloak. His woman wore gold chains, rings and bracelets, a tunic and a robe over it bound with a girdle. Her hair was loose on her shoulders, and frequently she dyed it yellow. Boadicea, it has been suggested, was our first intentional blonde. This, of course, was before the Roman invasion. In Anglo-Saxon days both males and females learned to use wool as well as linen, and the arts of spinning and dyeing made great advances. Fabrics were exported to the Continent, sometimes embroidered in gold. A treasured relic is a gold breastplate, which must have been meant for adornment. Sir Walter Raleigh thus describes an aristocrat of that period:

> His dress was a tunic of forest green, trimmed at the throat and cuffs with what was called miniver, a kind of fur inferior to ermine, and formed, it is believed, of the skins of gray squirrel. This doublet hung unbuttoned over a close dress of scarlet which set tight to the body; he had breeches of the same, but they did not reach below the lower part of his thigh, leaving the knee exposed. His feet had sandals of the same fashion as the peasants, but of finer materials, and secured in the front with gold clasps. He had bracelets of gold upon his arms, and a broad collar of the same precious metal about his neck. . . . Behind his seat was hung a scarlet cloth coat lined with fur, and a cap of the same material richly embroidered.

Nor was this gentleman's dame so modest in her habiliments as her successors in certain periods. Scott says:

> Her locks were braided with gems, and being worn at full length, imitated the noble and free-born condition of the maiden. A golden chain, to which was attached a small reliquary, hung around her neck. She wore a bracelet on her arms, which were bare. Her dress was an under-gown and kirtle of pale sea-green silk, over which was hung a long loose robe, which reached to the ground, having very wide sleeves which came down, however, very little below the elbow. This robe was crimson, and manufactured out of the finest wool. A veil of silk, interwoven of gold, was attached to the upper part of it, which could be, at the wearer's pleasure, either drawn over the face or bosom, after the Spanish fashion, or disposed as a sort of drapery round the shoulders.

Married women used a curling iron to dress their hair, and painted their faces with rouge. But the Egyptians and Assyrians had known those tricks several millennia before.

V

After the Norman conquest the nobleman wore a long gown reaching to his feet, embroidered with gold, and over it a hooded and buckled cloak. His dame wore a loose flowing gown, with a robe over it and a purse at the girdle. In the latter part of the reign of William II (1087-1100), a Norman tailor made his way to England, and a certain individuality manifested itself in styles for men, including absurd long-toed shoes, while women began lacing their gowns. Under John women's clothes again became almost shapeless; in the reign of Edward II, for the first time, colors were blended in fabrics. Stamped velvets, brocades and satins lent beauty to the attire of the gentry, for the men dressed even more gayly than their women. But the ladies retaliated in the next reign by adopting complicated head-dresses, with alluring trappings; and then, in the reign of Henry VIII, the pleated skirt made its appearance.

Lest this chronicle, sketchy as it is, become tiresome, let us hurry past the ladies' picture hats, sometimes a foot and a half high, the men's feathers and perukes. When Cardinal Wolsey appeared publicly in his red robe of satin, as H. Dennis Bradley tells us in his whimsical *The Eternal Masquerade*, he wore a red robe of satin, taffeta or damask, and upon his head "a round pillion, with a noble of black velvet set to the inner side, and a tippet of fine sables about his neck. Borne before him, first came the great seal of England, and then his cardinal's hat carried by a bare-headed nobleman." His mule was in crimson velvet and gilt stirrups; and four footmen with gilt pole-axes accompanied his ostentatious progress. Upon the women Henry imposed strict limitations; he and his cardinal would do the dressing.

In that era, and for long thereafter, the gentleman spent much more than his spouse upon a wardrobe. Pepys devotes an occasional passage in his undying diary to the budget for his clothes.

> This morning came home my fine camlet cloak [he wrote], with gold buttons, and a silk suit, which cost me much money, and I pray God to make me able to pay for it. To my great sorrow I find myself £43 worse

than I was last month, which was then £760 and now is but £717. But it hath chiefly arisen from my layings out in clothes for myself and wife; namely, for her about £12 and for myself £55 or thereabouts; having made myself a velvet cloak, two new cloth suits, black, plain, both; a new shag gown, trimmed with gold buttons and twist, with a new hat, and silk tops for my legs, and many other things, being resolved henceforth to go like myself. And also two periwigs, whereof one cost me £3 and the other forty s. I have worn neither yet, but I will next week, God willing.

The new camlet coat, our devout diarist reveals at another point, cost him £40; and when one remembers the greater purchasing power of the pound sterling in his day, this must have been quite a respectable garment. Camlet was a fine, closely-woven, almost waterproof fabric of camel's hair, much esteemed in that day. Pepys wore his new suit to Hampton Court, where he saw the King and Queen set out toward Salisbury. "But it was pretty," he writes, "to see the young, pretty ladies dressed like men in velvet coats, caps with ribands, and with laced bands, just like men."

VI

Women began wearing décolleté gowns about the end of the Middle Ages, and thus, according to the sociologists, sought to attract men by a combination of drapery and nudity. Not until the end of the Eighteenth Century did mere man resign himself to his status, and abandon individuality in decoration and dress. "If there is a lack of romance sartorially for men," says Professor J. C. Flugel, "their very uniformity saves them among themselves from envy, jealousy, petty triumphs and defeats and the spitefulness engendered by the details of women's clothing. One woman may humiliate another to the point of lasting bitterness by being more effectively dressed." And in the Twentieth Century women vie with one another in their expenditures.

We know how Sir Walter Raleigh dressed from the paintings of his gallant gesture in making his coat a causeway for Elizabeth; from costume balls and otherwise we are aware how the Duke of Buckingham, favorite and crony of Charles I, decked himself out. The vesture of the English during the reign of

George III, however, had its direct effect on the American colonists and on posterity. During the earlier part of that era coats were cut on lines from which the present morning coat has been derived, but the prototypes were free with their coloring, as is not true now. And there were other coats, some with long tails and some with short, many with collars fantastically cut; with them were worn wigs and cravats. It was this which set the pace for men in America; for while Arkwright was tinkering with his cotton-spinning frame, the well-to-do here imported from England their outfits for dressed-up occasions. The men who framed the Constitution got the very garb they wore from their late oppressors. Most of them, however, instead of wearing wigs, powdered their hair and caught it back with ribbons into a queue. They had silk coats and nankeen knee breeches.

Had that good democrat, Thomas Jefferson, been present—he was then our Ambassador to France—he would have been as gayly attired. "As for admiration," he wrote to a niece, "I am sure the man who powders most, perfumes most, embroiders most and talks most nonsense, is most admired." He did not talk nonsense, but he powdered and perfumed aplenty. And in another letter he said: "The article of dress is perhaps that in which economy is the least to be recommended. It is so important [in married life] to each to continue to please the other, that the happiness of both requires the most pointed attention to whatever may contribute to it—and the more as time makes greater inroads on our person. Yet, generally, we become more slovenly as personal decay requires the contrary." Not even Alexander Hamilton, who was present at the Constitutional Convention in Philadelphia—and wanted to make this government an elective monarchy—was more dandified than Jefferson.

The total population of the thirteen new-born sovereign States at that time was considerably less than the population of New York City now. Silk was being imported, and George and Martha Washington would have thought it beneath slave-owning gentlefolk to wear in public garments fashioned here. For home wear, to be sure, and for trips about the plantation, coats and trousers manufactured in their own households were good enough for gentlemen. The garments were made of wool grown on their own farms, carded and spun, fulled and finished, cut and sewed on the spot.

VII

These colonial households, as a fact, afforded our earliest impromptu factories. Cloth was made not only for the family but for sale outside. The provincial governments offered bounties to encourage the growth of wool and flax, and to encourage their manufacture, but for a century after the earlier colonies were established these bounties had no takers. It was not until after household products demonstrated their commercial practicability that factories, somewhat as we know them now, began springing up outside.

These factories, notwithstanding those who use the Revolution and the War of 1812 to feed their nationalistic twisting of the lion's tail, contributed directly to both conflicts. Even as far back as 1731, Richardson Wright tells us in *Hawkers and Walkers in Early America,* ten thousand beaver hats were manufactured annually in New York and New England. By 1771 thousands of Scotch-Irish weavers, thrown out of employment at home, came to this country seeking work, and found it. An export trade sprang up with Canada, the Barbadoes and Bermuda. The colonists even had the effrontery to send their commodities to England. Charles and Mary Beard agree with Arthur Schlesinger that out of this trade war sprang our armed wars with Britain. The mother country sought to curb her over-ambitious children by taxation and embargoes; there were retaliatory boycotts, then battlefields. Each time factory production was stimulated here.

But it was not until a century ago that Lowell, Massachusetts, was built. John T. Flynn asserts in *Nation's Business* that the men who built cotton power-mills there anticipated modern industrial conditions with a "vertical" trust, a corporate merger, industrial housing, welfare work and fairly enlightened employee relations. That mill stands as this is written, changed but little;

yet New England wonders why the South is taking her manufactures away from her.

The economies of standardized output, made apparent at Lowell and later industrial centers, contributed to the standardization of men's clothes. When our soldiers left the fields of Flanders and France they got out of drab uniforms into mufti as comfortless and characterless as any apparel could well be. Woman, on the contrary, had learned from leggings and khaki bloomers a new and delightful freedom of movement; and it is safe to assert that she got more fun out of her emancipation in that direction than from the political emancipation which was her reward after the World War. The knee-length skirt seems to bolster afresh the established doctrine that shame comes from clothes, not clothes from shame; for I remember, as a small boy, that on windy days a group of elderly men used to foregather at a corner of the public square in our village, ostensibly to gossip but actually to leer at feminine ankles fortuitously exposed. No such group gathers nowadays. One of the women's magazines even advertises that legs are no longer news.

But while the machine has so standardized men's clothes as to make it possible, this year, to wear last year's suit, it has had a curiously different effect on women's attire. By tradition and by predilection, women now spend far more on this department of their lives than do men, and thus offer a more prosperous and docile market for the style-maker. There may be a threat against lengthening the skirt and evoking the corset once more; one doubts whether it will be fulfilled. Corsets were invented in the Sixteenth Century for the villainous Catherine de' Medici, and are as villainous as she. Will they return to put their blemish on an apparel now distinctly sensible, healthful and comfortable? May the ladies guard with eternal vigilance their sartorial freedom.

VIII

Women are acquiring, meanwhile, new fabrics. A professor of chemistry has announced that from asbestos will come frocks with a sheen as charming as that of silk, a durability as great as that of homespun, and a production cost about half that of other desirable materials. Artificial cotton can now be made from a fiber root, discovered by Dr. C. J. Hedley-Thornton of England, who noted that humming birds in British Guiana made their nests of it. The plant grows readily in temperate zones, and may eventually administer, for all we know, the *coup de grace* to what we once called King Cotton. New England and the southern United States, which have been trying to restore cotton to the good graces of the stylist, will observe the progress of this new industry with dismay. They must believe nearly anything in the presence of rayon.

Rayon is man's first artificial textile fiber. It looks like silk, but there the resemblance ends, for it is manufactured from cellulose. The spruce pulpwood that goes into your daily newspaper makes a quite good raw material for it; so do the linters from Eli Whitney's cotton gin and the spongy interior of corn stalks. This material is put through a series of processes in the factory. It is cooked, washed, bleached, and rolled. Then it is soaked in a chemical, pressed, torn into bits, churned with another chemical, thinned out, mixed again with the first chemical, aged like beer in vats, filtered and forced through tiny holes as long filaments. It is a triumph of the chemical engineer in collaboration with the machine.

Silk, which sells around six dollars a pound raw in the United States, costs about twice as much in that state as rayon; and silk or wool can be interwoven with the new fabric. The process for making it was patented in 1884 by a French Count, Hilaire de Chardonnet, but the first factory in this country was established in 1912, in Pennsylvania. In 1927 we used one hundred million pounds of rayon, of which we imported one-sixth; its consumption, that is to say, was then actually greater than that of raw silk, despite the youth of the industry.

Yet curiously it has not hurt the silk business. For one thing, even your maid comes to work nowadays in silk stockings; in England, Queen Elizabeth was the first so to adorn her ankles, and for a long while she stood alone. Also, silk and satin frocks are popular now; so that while we were reaching the high water mark in the use of rayon, our importations of silk mounted to more than four hundred million dollars, which was about one-tenth of all we spent for foreign goods. Every year we use about seventy-five million pounds of this precious material, which is the strongest, in the tensile sense, of the textiles. And we have imported the worms into the United States. Will Rogers reports solemnly that, while they worked only three months a year in Japan, they work the year 'round in California.

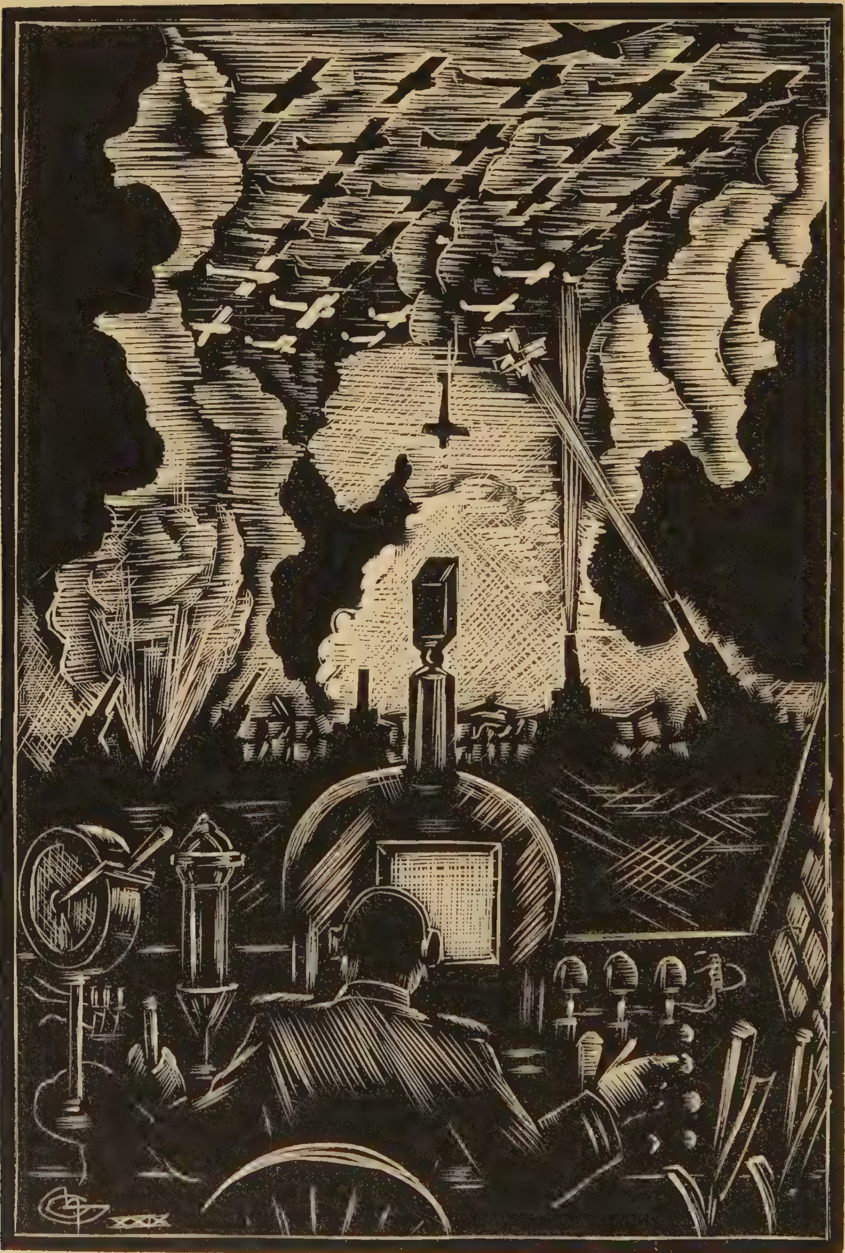
Will the *bombyx mori*, which spins so patiently the filaments to adorn womanhood, be exempted in time from the toils of human vanity, as were the *murex brandaris* and the *murex trunculus*, those mollusks of tropical waters which supplied the costly imperial purple of ancient Tyre? The chemist and his ally, the machine, have put this royal dye within the reach of every shop girl, and the mollusks now spawn undisturbed in southern Mediterranean seas. But a dye is not a fabric. Silk, since prehistoric times, has caught the imagination and held the fancy of humankind. There have been periods when it was worth its weight in gold. Its fiber has one-third the strength of an iron wire of the same diameter. Its texture and its tractability in taking colors, its sheen and its grace, seem likely to make it pre-eminent, certainly for generations to come, in the field of dress.

IX

No, the god from the machine is not likely to substitute rayon altogether for its gracious predecessor. Men are wearing underthings made of it, but then men are not so discriminating as their better halves; Waldemar Kaempffert is even predicting that in summer they will soon wear paper suits, which will cost perhaps two dollars each, will withstand the rain, and can be discarded at the end of two weeks. If this happens, the Germans must look to their laurels in the production of *ersatz*. As for the ladies, they are likely to cling to the aristocratic silk.

Not that the machine has not done democratic things. It has all but erased class cleavages as expressed in clothes. The haberdashery clerk now looks quite as well dressed as the Wall Street customer or the captain of industry. On the street the maid-of-all-work, to the inexpert glance, is well-nigh indistinguishable from her mistress. The machine has toppled the peaks into the valleys; it has leveled the old distinctions in garments.

When we recall the colonial housewives, bending over the spinning-wheel or the back-breaking hand loom, we begin to perceive that in the matter of clothes the machine has done rather better by women than by men. Even in those rare homes where domestic dressmaking is still practiced, the sewing machine is driven oftener than not by electricity. A vast drudgery has been abolished, on the distaff side (that very phrase is derived from one form of drudgery!), while on the other side of the house there has come a meek subservience to somber patterns. In this Twentieth Century, while woman was coming into the blossom and flower of her wardrobe, man has been descending into an apparel more and more drab. While his mate seemed each day more luminous and alluring, he seemed more hopelessly commonplace. The male who manufactures or merchandizes textiles and the other materials which go into clothes, or the finished commodities themselves, may console himself with the thought of the wealth thus brought to him by the machine, for clothing is our fourth industry in size; but this is a pale recompense in comparison with the benefactions it has wrought for woman. In a very real sense the mechanizing of clothing has brought her liberation, her emancipation.



CHAPTER FIVE

WEAPONS: From Club to Anti-Aircraft Gun

I

ANTI-AIRCRAFT batteries now fire at a swiftly moving target invisible to the men of the gun crew themselves. The whole formula of elevation, trajectory, wind velocity, density of the atmosphere, and the progress of the target while the missile is on its way, is calculated in about one second, with great accuracy, by machinery; and the gun itself is set, aimed and fired by machinery.

This is one of the great triumphs of modern man's ingenuity in devising lethal weapons. It all but eliminates human defensive fallibility. The gun is as near a robot as anything the dramatist had in mind when he invented the word. If it does not do its own thinking, it goes through certain processes with greater precision and rapidity than the gunner's brain can conceive of.

Even seasoned and phlegmatic gunners are shaken and unnerved in battle. This is not necessarily due to fear, but to the violent concussions of rapid-firing cannon. Cotton or other protective devices in the ears have proved of little avail, for the shock of the explosion is felt through the whole body. This has introduced into marksmanship a grave element of uncertainty. The data for firing are now computed at a distant central station, where the men operating the computing machinery are free of nerve-strain, and are transmitted by electricity to the guns themselves. Formerly eight seconds were required for "laying" the anti-aircraft gun, and at the end of the World War the batteries were equipped with elaborate systems of weights, scales and sighting devices. The loss of time was well-nigh fatal against an airplane moving, say, at the rate of two hundred miles an hour, even though due allowance was made for its rate.

One of the almost human—or inhuman—devices attached to the thoroughly modern anti-aircraft gun is the torque amplifier. It is operated by a small electric motor, controls the movement of the weapon in following its target, and points it. The device was invented by the late W. P. Wilson of the Ordnance Bureau. It is remarkable, but not more remarkable than some of the other parts of the fire-control equipment. The guns themselves, the carriages and the ammunition have been improved by applying mathematical, chemical and electrical principles to their mechanics, and these problems presented even greater difficulties than the torque amplifier. Through them, three men have been eliminated from the gun crew. The amplifier is dependent for effectiveness, of course, on the accuracy of the data received from the central computing machine, and on the accuracy of the gun itself.

The computing machine is called a director. It "observes" the target, and automatically computes its position in space—not only automatically, but continuously, as the position changes. At the same time it applies corrections for all the factors which may influence the flight of the projectile, such as wind, muzzle velocity (in the case of these guns, half a mile a second), atmospheric density, and drift. A part of this super-computing machine is an electrical transmission system, which sends the data automatically to the guns.

Then there is a height finder, an optical instrument which determines the altitude of the target. There is a listening device, called the sound locator, by means of which a searchlight can be directed at the target almost instantaneously at night. Man has devised mechanical eyes and ears much superior to the senses with which nature has equipped him.

As to the batteries themselves, they consist of three main types of gun. There is a powerful three-inch high velocity weapon, with an effective range of eight miles, which can be towed behind a truck at forty miles an hour. It can be placed in readiness for its deadly work in a very few minutes, and discharges twenty-five shots a minute. On a fixed amount there is the one hundred and five millimeter weapon meant for the protection of cities and fortifications; it has a range of twelve miles, and fires fifteen projectiles, each weighing thirty-five pounds, per minute. And there is the thirty-seven millimeter automatic cannon, which has the highest firing speed of all: one hundred shots a minute, each shell containing a charge of explosives sufficient to disable an airplane. Against low-flying airplanes there can be used, in addition to such a battery, several types of machine guns. It is said at Washington that this equipment "compares very favorably" with that possessed by foreign powers.

Thanks partly to the sound detector, anti-aircraft batteries can be operated at night even more accurately than during the day. All the equipment has been standardized, and manufacturers are in readiness to turn it out at short notice in any emergency. Major General C. C. Williams, chief of the Bureau of Ordnance, says that the speed made possible by standardization eliminates "backing and filling" by the army and navy, saves the time required for expensive tests, and should mean a saving, in the event of "the next war," of fully two billions of dollars. The tests have been made. Plans and specifications are in readiness. And those who believe that the navy still has its day, despite aircraft, are jubilant at the evidence that a fleet can be made comparatively safe from its enemies aloft. Moreover, with such equipment as we now have, London need not have suffered as she did in the World War air raids.

II

Compare these modern super-batteries with man's early halting steps toward offense and self-defense. It may be said that when the primitive male grasped his first club or threw his first stone he invented weapons. He had found something more hurtful than his fist, effective at a greater distance than the length of his arm. When finally he learned to chip stone into desired shapes, and learned to cut hide into strips, he found himself with a rude mace, a battle ax or a spear. When it occurred to him to throw the spear, he had a javelin.

Probably the arrow came much later. Ethnologists attach special importance to the brilliant flash of intelligence which prompted primitive men to invent the bow; for they believe that out of the twang of the bow came musical instruments, and out of the circles which the string made possible came the potter's wheel. Man was beginning to learn now, and it made him dissatisfied. He must find a way to throw his arrows to a greater distance, with a greater deadliness. So far he had used only tools in fashioning his weapons for the chase and for combat; now he devised a machine. He invented the crossbow.

At the outset, to be sure, the crossbow had only such power as human biceps could give it; but presently an amended form was devised, called the arbalist, in which the mechanics of a wheel and handle enabled the marksman to manipulate a weapon which, unaided, he could not have discharged. The bow was attached to a stock, with a groove for the missile; there was a notch to hold the string and a trigger to release it. There were variations of this device; the ballista, which hurled stones as well as spears and arrows; and the catapult of Julius Cæsar's time, which discharged javelins with considerable accuracy, as well as square-headed bolts.

Meanwhile, having learned to work in metals long before Cæsar's time, man had begun to make swords, sabers, and daggers. Yet he still used the sling-shot, which David and Goliath helped to make famous; in Roman armies the slingman was called a *fundator*, and this kind of fighting persisted until the Seventeenth Century, long after gunpowder had been invented. The Chinese, who anticipated the rest of the world in many ways, were the first, so far as we know, to use gunpowder, long before it was employed in Europe; indeed, there is a legend that the Chinese had armored ships thousands of years before the *Monitor* and the *Merrimac*. As for the crossbow, they had one which was a repeater, a sort of primitive machine gun, firing arrows instead of bullets.

Although gunpowder was to work a great change in the machinery of armament, it did not do away for a long while with more primitive weapons. Nor did it alter the fundamentals of warfare, which were conquest of territory, from which tribute might be levied, loot from cities overrun, and captives. The slave system had its roots in conflict. Men taken in battle were more amenable to discipline, more biddable and more educable than the small peasants, freeholders and yeomanry of ancient society. Some of them brought to their captors unusual talents, and were able eventually to achieve freedom as a gift or by purchase. Nor may we say, however repugnant slavery may be to those who live under republican institutions, that the system was wholly disadvantageous. The culture of Greece was based on helotry.

Philip of Macedon, who became King in 359 B.C.—the King of a small principality with no seaport, no large city, and no industries to speak of—set up the most efficient armed force the world had seen to that time, and by means of its efficiency built his little country into a great one. In Macedonia, when he ascended the throne, there was an infantry of small size levied from the peasantry and a cavalry of noblemen. He devoted years to the discipline and increase of this army. His troops were still spearmen in close formation, as they had been in the days of ancient Egypt, but he gave them a greater power of resistance by equipping those in the rear rows with longer lances, thrust between the front-line men. As the archers on horseback came into greater use, they were used on the flanks of this central formation; in Homeric days the horse had been used almost solely for chariots. At first the men on horseback fought solo, but Philip trained a cavalry to maneuver in mass formation and to charge. The footmen could not stand up against a flank or rear attack, for they were not mobile. They served merely to hold the enemy's main attack, whereupon the horsemen assailed from the flanks. This strategy, and the use of catapults, made Philip invincible in the field. Prior to his day, catapults had been used in sieges, but never in the field.

Philip thus mechanized and professionalized fighting to a greater extent than any of his predecessors. Not until two thousand years later, however, was the full evil of mechanization and professionalism to become apparent. This was in the Civil War which for thirty years, from 1618 to 1648, devastated Germany. Ordinary conscription of peasantry was found to be useless against highly trained forces. Gunpowder had been invented, muskets had come into use, and infantry had to be highly disciplined to withstand their terror. Not many cannon were in use. They were small and liable to explode. But the muzzle-loading guns, even though they were effective only at a few score yards, wrought disaster when fired in volleys. On both sides it became necessary to maintain seasoned soldiers. And as the country became more and more impoverished, continuous looting was necessary in order to feed these men and meet their payrolls. They became privileged brigands. Pillage and outrage were commonplaces. At the close of the Thirty Years' War all Germany lay desolate. A century was required for recovery from this, the most savage and cruel conflict the world had witnessed to that moment, excepting only the efforts of African conquerors to establish themselves in Europe.

The introduction of musketry meant the end of feudalism's distinguishing characteristic, the knight in his coat of mail, who had lent picturesqueness to the Crusades and a whole era of human history. The earlier cumbersome suits of solid armor had been replaced by lighter equipment, made of metal links, which did not so greatly tax the strength of the wearer; but before this happened the use of armor had effected a change in English common law, the effects of which we feel to-day. Before armor was manufactured, "full age" in England was seventeen years, the age of puberty. But a boy of seventeen could not acquit himself creditably in a suit of mail, and so the age of legal—and military—responsibility was moved up to twenty-one years. This, the law of the gentry, gradually, as was often the case in that country, was applied to the yeomanry. This is the explanation given by Pollock and Maitland in their *History of English Law.* The custom of regarding and legalizing twenty-one as "full age" is now almost universal throughout the western civilized world. The American colonies took it over bodily from the mother country. Thus to-day, although we may be drafted and sent to war at the age of eighteen, we cannot vote for the Congressmen who declare war. The fact is that we cannot vote until we are twenty-one because we cannot until then wear a coat of armor!

The American colonists were equipped with smooth-bore, muzzle-loading, flintlock rifles, for defense against the Indians and hostile French raiders, as well as for hunting. At the close of the Fourteenth Century guns had come to be used for the first time, in Italy and France, for sport as well as for fighting, although gunpowder had been invented at the beginning of that century. But even in the Seventeenth Century, when this country saw its first permanent European settlements, there was no realization that to give a bullet a rotary motion would increase its velocity and accuracy. Those who have read James Fenimore Cooper's romantic tales probably have a highly exaggerated notion of the range and precision of Leatherstocking's rifle. The firearm of that day had not been mechanized to a point of true efficiency. When rifles and shotguns came to have a breech-mechanism, and then a magazine for repeaters, with a movable breech and extractor, man took a long step forward in that field.

Two centuries after this country was settled, the chief source of supply, so far as firearms were concerned, was the itinerant peddler, who went about the country in a wagon, and sometimes, when opportunity offered, bootlegged guns and ammunition to the Indians. There were itinerant fencing masters, too, who would visit towns for a week or so and give lessons to the young blades of the community. The rapier was still fashionable for dueling in some places, although pistols—the revolver was yet to come—were generally preferred.

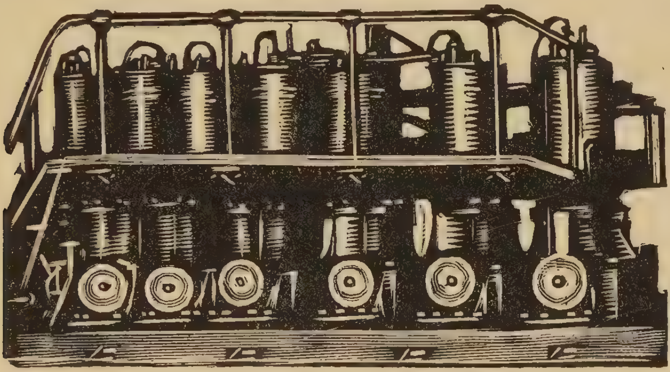
III

The arms and armaments of the Revolution and the War of 1812, even those of the Civil War, although they were machine products, were neither so efficient nor so expensive as those which were to come later. Elsewhere the machine works economies both of time and money. For naval and military purposes it saves only time, and that at a greatly multiplied cost. During the World War the mechanization of the fighting arm reached a stage theretofore unprecedented, and took what seemed to many of us novel forms: the tank, the submarine, the dirigible, and the airplane. Yet in fact none of these was new. The imagination of man had toyed with them for long periods.

Leonardo da Vinci, who died in 1519, drew plans for a workable military tank, as one of his many contributions to mechanics. Possibly da Vinci suffers somewhat from having been press-agented by Walter Pater. When we hear his name we think of Mona Lisa's smile; whereas his genius was many-faceted. He was not only a painter, but an architect, engineer, scientist, mechanician and musician. "What military expert," H. G. Wells inquires, "ever had the wits to study Leonardo?" British military authorities were even contemptuous in 1911, when J. A. Corry of Leeds exhibited to them a fully equipped model fighting tractor-tank. Their attitude was to cost the lives of many Allied soldiers; for it was not until September, 1916, two years after the war began, that tanks were actually put into use, and then at the instigation of the Admiralty, not the army. Their effectiveness in trench warfare was at once apparent, and it was an effect not merely military but moral. These huge steel monsters, spitting fire and death, shook even the stoutest hearts among the superbly disciplined German troops.

As for the submarine, man has envied the fish since early days. It was not until 1773, however, that an undersea boat was constructed for use in warfare. From the modern standpoint it was a fearful and wonderful contraption. David Bushnell, its inventor, constructed a hull large enough to contain the body of one man, with a "magazine" large enough to hold one hundred and fifty pounds of gunpowder. This was to be attached with a screw to the bottom of an enemy warship and exploded with a time fuse. The submarine was driven by manpower. There was a screw propeller to be operated by hand or foot; the occupant of the boat not only drove it but steered it, and caused it to rise or descend. It could achieve a speed of three knots either forward or backward. Water was admitted through a valve to submerge the boat, and forced out with a hand pump to rise. The operator of this queer craft once succeeded in getting beneath a man-o'-war, but he couldn't fasten his battery because he could not drive the screw through her copper sheathing.

The modern submarine, with its storage batteries, its periscope, its Diesel engines, its apparatus for signaling miles under water, its torpedo tubes, anti-aircraft cannon, and machine guns, its gyroscope steering compass, its air-compressors, dynamos, and ventilators, and its cruising radius of thousands of miles, as contrasted with Bushnell's one-man craft, measures man's progress during a century and a half as an underwater enemy. During the World War a single German U-boat, within an hour and thirty minutes, destroyed three 12,000-ton British armored cruisers. Another sank the *Lusitania*, with a loss of 1,100 lives. Another, the *Deutschland*—not a U-boat this, but a merchant submarine—crossed from Bremen to Baltimore in July, 1916, with a cargo of dyes, drugs, and so on, boasting that this was the initiation of an intercontinental commercial service.



But man has envied and emulated birds even more than fish. The Chinese tried to fly with kites. Other ancients thought they could fly without mechanical aid provided they fasted long enough, or took certain unsavory medicines. The early Babylonians had a notion they could harness flocks of birds to a chariot. Others thought the trick could be turned with artificial wings: the legend of Dædalus is familiar to all of us. An executive of the Field Museum of Natural History asserts that Shun, a Chinese emperor, about 2258-2208 B.C., actually ascended and actually descended in a parachute. Shun, so this surprising story goes, was the first human being to fly. If so, his secret was lost for some thousands of years, for it was not until near the close of the Eighteenth Century that Europeans found they could ride the gale in balloons. The first person in Europe to make an ascent was a Frenchman, Pilatre de Rozier, who got fifty feet into the air at Paris in 1783. Not long afterward two brothers traveled twenty-seven miles in a balloon inflated with hydrogen gas. The English Channel was crossed thus in 1785, but it caused no such excitement as when Jean Bleriot flew across, on July 25, 1909, in his monoplane.

From the balloon was developed the cigar-shaped dirigible, with a steering gear and engines powerful enough to drive it even into a head-wind. Early in the World War Zeppelins did a deal of damage to London, until they were conquered by airplanes. After that the balloon and the dirigible ceased to be of much military use, save for observation and photography. The airplane came to be the important military engine aloft.

Two of the most important minutes in history passed while Orville and Wilbur Wright, in September, 1902, kept a crude airplane in the air at Kitty Hawk, N. C. Not until 1908 did they make a public flight. On September 10 of that year Orville Wright remained in the air more than an hour at Fort Meyer, near Washington. Yet even six years later, when the World War broke out, flying had by no means been perfected. It was the tension and the drive of that crisis which made of the plane an instrument of comparative stability. Immense bombers and waspish individual combat machines were manufactured at feverish speed; and the aces who were victorious in single combat aloft became national heroes.

IV

Now, while man was modernizing and improving mechanical agencies of destruction in the air and beneath the surface of the sea, during the World War, he was reverting, in many cases, to primitive weapons for use in trench warfare. After the Battle of the Marne, September 6 to 10, 1914, the German armies dug themselves in beside the Aisne, and the warfare on the western front became a trench warfare. The Allies did not have the tanks and heavy guns necessary to smash through these lines. On February 28, 1915, the Germans resorted to an ancient warlike device; they introduced flame projectors. Well, the early Chinese had flame throwers, and Archimedes invented one. The saber and bayonet used by the opposed armies were of ancient lineage, for they went back to the bronze and iron ages. The modern howitzer has the properties of the old mortars and catapults; the hand grenade dates back to the Sixteenth Century. The German troops wore metal hats and the officers spiked helmets reminiscent of feudal days. As for the cannon, weapons of similar characteristics had been introduced into England in 1338. Field guns had come into use in the Fifteenth Century; the French had used mortars in 1634, and English yeomen had used hand firearms in 1486.

At sea, warlike equipment has been improved more slowly than on land. The organization of a naval force in England is attributed to Alfred the Great, but the fleet did not actually take shape until the reign of Henry VIII. In those days wooden sailing ships were used, with tiers of broadside cannon, and the chief emphasis was upon the number of fighters for boarding assaults. Gradually the human element was subordinated to the mechanical: speed, mobility, and power of the batteries. Between 1814 and 1859 steam was substituted for sails as a motive power; and 1859 was further signalized by the launching of a French ironclad, *La Gloire*. (During the Crimean War the French had sheathed some floating batteries with iron, which probably originated the idea in the western world.) *La Gloire* wore iron plates four and one-half inches thick, an impervious protection in those days. Two years later the British launched the ironclad *Warrior*. But it was not until 1862, when the Confederate *Merrimac* and the Union turret-ship *Monitor* met in Hampton Roads, that the true importance of this innovation became important. Neither vessel was seriously damaged by enemy fire; more, Ericsson's *Monitor* revealed the value of a revolving turret to house heavy batteries—an idea still in general naval use. The broadside method became obsolescent save for minor guns. The whole construction and plan of warcraft was revolutionized by the introduction of iron sheathing and the turret, both products of the machine.

In spite of the lessons taught by the *Merrimac-Monitor* encounter, the United States manifested little interest in its navy until after the Spanish-American War. Then the fleet began to assume more formidable proportions, and for a time was second to England in strength. In 1915, owing to excitement over the World War, expenditures of $150,000,000 during the ensuing year were authorized, in order that the navy might be expanded and improved. Already we had some quite respectable warships. The *Nevada* and *Oklahoma*, for example, authorized in 1912, were superdreadnaughts capable of making twenty knots, with displacements of 27,500 tons, with engines which could develop 28,000 horsepower each, and each armed with ten fourteen-inch guns in her four turrets, beside minor batteries. Two years later the *Pennsylvania* and *Arizona* were authorized, each to burn oil, each to carry twelve fourteen-inch guns, and each with a displacement of 31,400 tons. Three other ships authorized that year—the *California, Idaho* and *Mississippi*—were of 32,000 tons each.

With battleships costing from $6,000,000, in the case of the *Oklahoma*, to $10,000,000, in the case of the last-named craft, it became apparent that as mechanical efficiency, speed and deadliness were increased, costs piled up at an alarming rate. Moreover, the restless ingenuity of designers and inventors rapidly rendered obsolete the warships on duty. How was Europe, shattered and impoverished at the end of the World War, to continue its ruinous naval competition? National pride prevented the principal combatants from proposing a let-up; the invitation could come with good grace only from the United States, now richer than ever. Thus the Washington Conference on the limitation of armament was held in 1921.

The outcome of this conference, and the establishment of the 5-5-3 naval ratio for Great Britain, the United States and Japan, are accessible in nearly any recent reference book. All that need concern us here is a mechanical development in construction which has come about since then. The conference limited cruisers only as to size, not as to number. They must not displace more than 10,000 tons. A race began to see which nation could build the biggest and most powerful cruiser within that limitation. Compounds of the lighter metals, aluminum and duralumin, were substituted wherever possible in their structure. The hull itself, partitions and transverse braces, even furniture, was made of these compounds. Only the sheathing was of steel. It became possible in this way to build cruisers longer than battleships, although not so wide. It became possible to give them a higher freeboard, which made for greater speed in all weathers, and made practicable a heavier armament. The machine, cheated of part of its work on ships of the line, had won a minor triumph.

V

It is not true—although perhaps no naval expert will concede this—that warships are meant solely to sink enemy vessels. They are not designed solely for fighting and for dancing on the quarter-deck. Their main task, because it is the task to which the greater part of their lives is devoted, is to protect the movement of commerce across the seas, and safeguard the journeys of the commodities that the machine emits with increasing velocity. No one can read the annual report of any Secretary of the Navy and fail to see how true this is. Our gunships, destroyers, and cruisers are to be found in every watery corner of the earth. In its military capacity the machine has made warcraft more effective and most expensive; in its commercial and industrial capacity it has made warcraft increasingly needful. On the Atlantic Ocean transport is secure enough. In the "backward" areas of the earth the merchant marine demands, and usually gets, a special guaranty of safety.

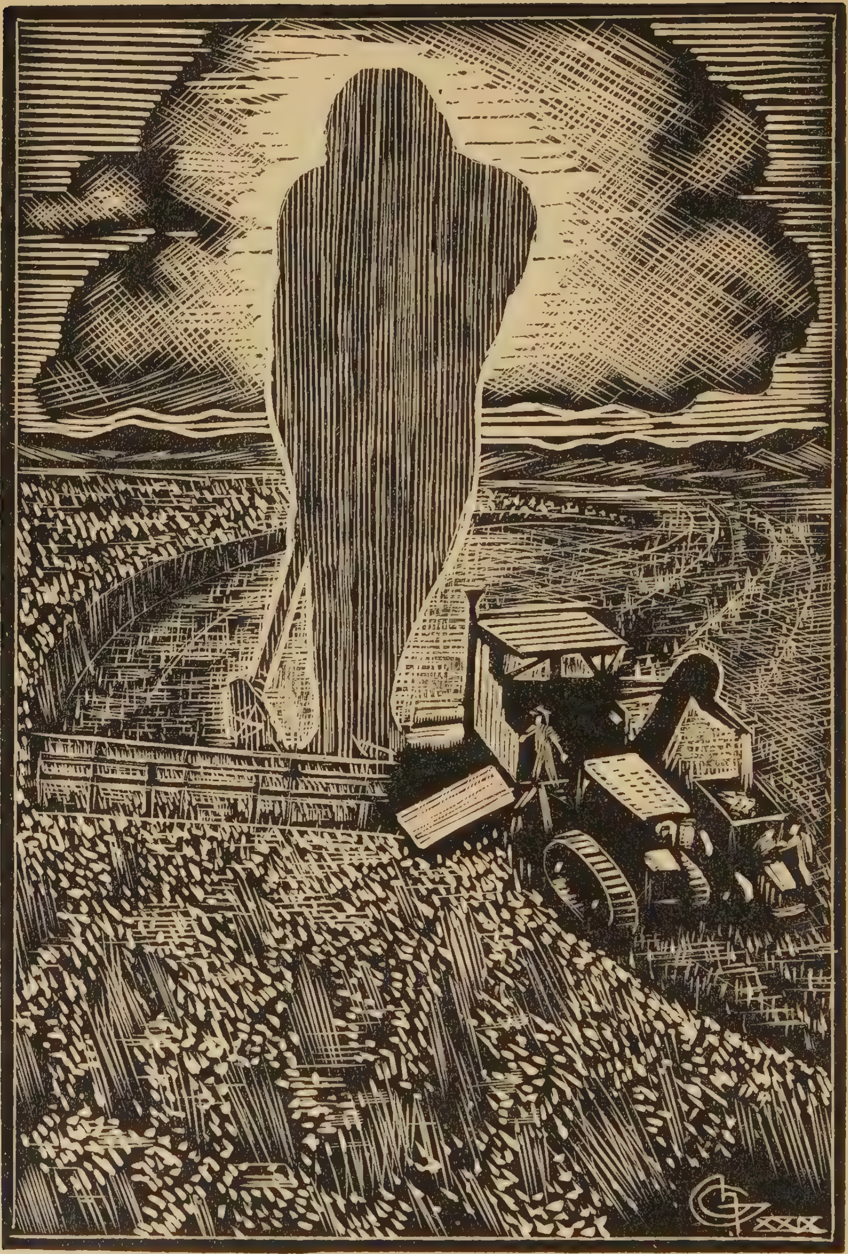
Moreover, warfare, like dueling, is now illegal. First, the Assembly of the League of Nations adopted a resolution that "all wars of aggression are and always shall be prohibited." Second, under a plan originated—or first publicly suggested—by Aristide Briand, more than a score of nations signed what is ineptly called "the Kellogg Pact," which renounces war as "an instrument of national policy." It is not surprising that this country tried to hog such glory as there might be in the latter covenant. In the same way we tried to appropriate the first reparations machinery by calling it "the Dawes Plan," although General Charles Gates Dawes does not yet know what it was all about. The plan was devised by Sir Josiah Stamp of England. Our self-assertiveness in such matters is blamed frequently on the Machine Age; actually it goes back, I suspect, to the arrogance and bigotry of early Puritan New England.

The League resolution applies to the whole world excepting Turkey, Mexico, Soviet Russia, and the United States. (This country is in good company!) Its weakness is that it does not define a "war of aggression." We have always sought to throw the onus of aggression on the other fellow, who has always denied the impeachment. The League is not likely to find a bully boasting that he started trouble.

And the mere renunciation of war does not get us far. It may prove to be like Rip Van Winkle's renunciation of drink. "This one," poor old Rip was moved to say, when repairing to the bottle, "won't count." And the United States, if it were to find another Spain to bully or another Nicaragua to override—without Congressional sanction—might simply say that this didn't "count." We shall see later, I think, that political agencies are likely to prove powerless in effecting world peace, and that we must look to an economic basis of amity. As legal achievements neither the League resolution nor the so-called "Kellogg Pact" looms large. Nevertheless they have an intangible value. So long as standing armies are drilled, accoutered and disciplined with a view to "the next war," so long as naval vessels are designed, armored and engined with a view to operation in the probable area of "the next war," we need, if we can arrive at it, a sort of mental limitation of warfare. Standing armies are of no use in peacetime save as berths for indolent militarists, who never expect to experience the discomforts and perils of the front trenches. Navies are of no use in peacetime save for terrorization and dancing on the quarter-deck. They are not actually outlawed either by the resolution or the covenant. But they are properly classed, mentally, with bootlegging and counterfeiting. We know their status, and can accurately rate their "experts," such as William B. Shearer, employed secretly by big ship-building corporations to attend the Geneva Conference in 1927 on the limitation of naval strength. Mr. Shearer has boasted that, with the aid of the American daily press, he brought the conference to naught. Even before he sued his former employers for pay, we knew the place he and his kind occupied in the scheme of things. For the resolution and the covenant had brought at least a sort of psychological disarmament. They had won a moral victory.

In peace-time naval vessels, aside from display purposes, are useful as a marine police force. It is interesting to note how recently this has come about. If we accept the scientific estimate that man has existed on this earth in somewhat his present form and character for fifty thousand years, and regard that period as compressed within a single year, it is but twelve hours since the first crude naval iron-clads met in conflict. It is but an hour since the first public pinfeather flight of an airplane, and but a few minutes since warships were equipped with their present anti-aircraft batteries. It is possible in this way to get a notion of the extraordinary speed with which automatic power has revolutionized arms and armament. No wonder Henry Adams cast about for some mathematic formula whereby to chart the curve of man's history and progress! Since the conversion of the tool into the machine, man has moved so fast that he is dizzy. He cannot calculate his rate of speed, nor guess what the future holds in store.

In the use of weapons, however, there is this physical fact to be noted. So long as man wielded the club, hurled the javelin, used the slingshot or fired the rifle, he was master of the instrument, and it obeyed his will. When he moved about, he took it with him. When he erected fortifications and embattled them with cannon, the situation changed. He must go to the weapon to fire it. The gun crew of the anti-aircraft battery is not its master, but in a very humble sense its servant. The gun crew only stands and waits. The men assist in moving the cannon from place to place, they assist in making it ready for firing, they replenish the ammunition. Machinery does the rest. One may regard this as a pleasant release from responsibility and strain; one may say that this subordination of the individual is psychologically meretricious. Therein lies a central issue of man's relation to the machine he has created.


XXX

CHAPTER SIX

FARMING: From Stone Hoe to Automatic Harrow

I

FARMING is the most backward of our major industries save coal mining. But it is agreed that the coal operator lags largely on account of stubbornness, arrogance, and avarice, none of which can be charged with justice to farmers as a class. Theirs is an occupation fifteen thousand years old, and the most important in which man may engage, since it is the only entirely indispensable activity; and it is a losing game chiefly because it has not been fully mechanized and modernized. Prior to the advent of the steam engine, the farm was as efficiently operated as the factory.

True, the farm is no stranger to the machine. In Montana a tract of ninety-five thousand acres is under cultivation with not a horse on the place, nor a mule. Instead, there are one hundred and nine tractors, which can plow a thousand broad acres a day; there are a hundred planting machines and seed drillers, capable of sowing three thousand acres a day; there are eighty binders, which cover seventeen hundred acres a day; there are eleven threshers, which garner twenty thousand bushels a day; and the average daily wage of the laborers is eight dollars.

Between the first hoe of stone fastened to a stick, or the first plowshare of sharpened and suitably bent sapling, drawn by women through the reluctant ground, to the modern gasoline harrow or plow, there stretches a gap which, until a century and a half ago—a trifle in the recorded history of men—tended hardly at all to diminish. One might suppose that the very antiquity of husbandry would confer upon its disciples experience and knowledge. The reverse is true, not only there but in other ancient practices. Fisheries and textiles, for example, were among the last to catch step with the Machine Age, despite their years. It is the newer industries, telephones, automobiles, the radio, which are first in efficiency. When one has got along very well, thank you, for thousands of years without the collaboration of the engineer and the chemist, or the assistance of the machines they perfect, one is disposed to rest conservatively on his oars. It is the young who are receptive to new ideas and new methods.

Yet the farmer, who is more truly heir of all the ages than the college graduate, has managed in the United States to multiply his productivity to an extent which has more than offset the drift of labor from rural areas to the urban industries. In the twenty years preceding 1929, while the population of this country was increasing by nearly one-third, the farm population was dwindling from 32,000,000 to 27,511,000. About four and one-half million persons were lost to our basic industry. In 1928 alone, 1,960,000 persons quit the fields for the factories, while but 1,362,000 left the city for the farm. Thus we had a gross rural deficit in manpower of some 600,000, and there was a great wailing and gnashing of teeth about it. Pessimists foresaw the time when we were going to starve, the whole "pack and passel" of us. This view, however, took no account of two counteracting factors. The birthrate on the farm is high, the deathrate is low. The net decrease in manpower for that year was estimated by the Department of Agriculture at but 188,000 persons. Moreover, individual productivity had increased, during the decade preceding 1929, by fifteen per cent. Total farm production has increased fifty per cent. faster than population. And the average yield per acre of the principal crops also mounted. Twenty million acres, formerly devoted to grazing or to raising food for farm animals, were released to cultivation for the needs of the human species. All told, crop production was five per cent. higher than in 1919. Why wail and gnash the teeth? What we were witnessing was a redistribution of labor to meet the demands of the market.

It must be admitted that economic pressure played its part in this redistribution. The man who owns an average hundred-acre farm in the United States cannot expect, even when due allowance is made for board and lodging, to gain as large a financial return as the city bricklayer. But there is no good ground for asserting that the shift of population left an inferior type in the fields. Nor is it provable that those who quit the farm were lured irresistably by the city. The farmer is paid in part in intangibles. Conditions of urban labor, in some respects, are less enticing. The rural laborer deals with living and growing plants and animals; he faces daily the fundamental facts of nature and life. The worker in the city deals almost entirely with inanimate materials and faces mere artificialities.

II

Man had lived upon the earth many thousands of years—how many thousands is a matter of guesswork—before he learned to till the soil. At first he wandered over the habitable spaces, hunting and hunted. Then he learned to domesticate animals, and became a nomadic herdsman, roaming with his flocks from grazing ground to grazing ground. Quite possibly it occurred to him to store fodder for his beasts, and then to beat out the grain for his own use before storing the stalks. From this may have come the thought of planting seed and returning later for the harvest. We have not found his earliest implements, for they were made of wood and have decayed. But we know that Neolithic man cultivated barley, wheat, and millet, although it is improbable that he knew anything of rye or oats. At first he tied a sharpened stone to a handle to till the ground, then began using a pole, perhaps with a horn lashed at the end. We may be sure that he, like the red Indian in America, delegated to the womenfolk the planting, care and harvesting of the crops. In some thousands of years it occurred to him that he might substitute docile oxen for women in pulling the sharpened tree limb through the earth.

In the Bronze Age metal sickles and scythes, as well as plows with metal shares, were hammered out. Fifteen hundred years before Christ the Egyptians and Sumerians were using them;

they even irrigated their fields; they had cattle, asses, sheep and goats. In the days of the Jewish patriarchs, Egypt was famed for her corn. And the Arabs of Alexandria and Cairo used not only irrigation, but fertilizers; they rotated their crops, grafted fruits, and wrote books on farming. We have a somewhat better notion of these peoples than of the Chinese, who may have begun farming much more than fifteen thousand years ago. Agriculture with them is truly immemorial, but their methods did not penetrate to the peoples clustered about the Mediterranean. The climate and topography of China are such as to give that country a fauna and flora similar to those of the North American continent; and since its civilization is older far than that of northern Africa, it is quite possible that implements which seemed to our colonial settlers up-to-date would have appeared at that time to the Chinese as of ancient usage.

Hesiod, whom agriculture moved to poetry, spoke of the plow in the Eighth Century before Christ as consisting of three parts: the share beam, the draft-pole and the plow-tail. It had ceased even then, that is to say, to be a mere tool; it had become a rudimentary machine. And Hesiod tells us that the Greeks used it for a preliminary plowing in the Autumn, another in the Spring, and a third before the seed were planted. Even in his day soils were mixed, as sand with clay, and fertilizers were utilized. But reaping was still done with a sickle, threshing by the hoofs of animals, and winnowing by accommodating winds.

That noble Roman, Cato, was not only a general and a statesman, but an authority on agriculture. His Sabine farm was a model in its day; and its owner counted his highest honors as having come from a book he wrote about husbandry. Pliny describes irrigation projects, and tells us of a Gallic cart he saw in 33 A.D. which was fitted with projections in front, to cut or tear off the heads of grain. Virgil waxed poetic over agriculture, and many other Latin writers spoke of such things, but they do not give us a quite competent notion of the actual processes, nor of the farm tools themselves.

As for England, it was not until 1534 that a comprehensive book about farming appeared there. It was written by a Judge of the Common Pleas, Sir A. Fitzherbert, and was published during the reign of Henry VIII. In it directions were given for draining, clearing, enclosing and fertilizing land, chiefly by manual labor. A century later red clover was introduced at the instigation of Sir Richard Weston, who had learned about it from the Dutch, and he imported into England also the custom of growing "artificial" grasses. By the end of the Eighteenth Century it was a common practice to alternate green crops with grains, but the work was still mostly manual, with beasts of burden to help. The implements could hardly be called machines. Not until the United States took the lead in the invention and improvement of agricultural machinery did it come to any great use in England.

III

The first American patent for a successful agricultural implement, so far as I can learn, was granted in 1803 to Richard French and T. J. Hawkins of New Jersey, who devised an awkward reaper. Necessity, we are told, is the mother of invention, and the stern necessities of pioneer life are held accountable in the main for the inventive genius of our people. Certainly those two were not left long alone in their field. Patents were issued with astonishing frequency. So many there were that I will attempt here to set down only a few of them, as marking milestones in the march toward mechanized husbandry. In 1812 Peter Gaillard of Pennsylvania devised a grass-cutting machine, and ten years later Jeremiah Bailey of the same State patented another which had the advantage of adjusting itself, so as to cut at the same height, whatever the inequalities of the ground. William Manning of New Jersey, in 1831, combined for the first time a grass-cutter and a grain-divider in a single machine. In 1833 and 1834 Obed Hussey of Maryland and Cyrus H. McCormick of Virginia invented machines which became the basis of all modern reapers. Most of us have forgotten Hussey; all of us know about McCormick, whose patent became the foundation stone of an immensely rich corporation. His ungainly harvester was the grand-parent of machines known now throughout the world, wherever wealth may be brought out of the soil.

Nelson Platt patented in 1848 the first self-acting "sweep" rake; and John E. Heath of Ohio took out a patent in 1850 for a binding machine to use cord or twine. Heath was the first to attempt to bind grain by machinery, and he had many imitators. But it was not until 1875 that John F. Appleby invented the processes, or discovered the principles, which are the basis of all modern binding apparatus. We now have combination reapers, threshers and binders, which cut and head the grain, thresh, clean and sack it, during a single journey across the wheat field; one of them can cover as much as 125 acres in a single day, with twoscore horses or a powerful traction engine to operate it. As for corn, we have mowers which cut two rows at once, bind the stalks, shock and cut the grain, gather and sack it. They can harvest an acre at a cost of $1.50 or less.

Let us look for a moment at what the machine means to the farmer whose fields are level enough to make its use practicable. One hundred years ago the labor required to produce a bushel of wheat was three and one-half hours. To-day, using machinery, the bushel can be produced with ten minutes' labor. The cost of production has been cut from 17¾ cents to 3⅓.

On modernized farms the hay is tossed as it lies by the hay-tedder, which has supplanted biceps and backs in curing the crop. As a rule the tedder is drawn by a horse or horses, but there are some operated by gasoline engines. We have draining machinery, machines for cutting or crushing fodder, oats and compressed cakes, machines for milking cows and churning their milk. The fine social eloquence that went into the poem about "The Man with the Hoe" would be wasted on an up-to-date farmer. He no longer gets himself muscle-bound with manual toil. If all our farmers were up-to-date . . .

IV

How can we expect all of them to be up-to-date? Let me quote from a study of population in an area of heavy farm failures in

Montana. "There were two circus musicians, a paper-hanger, a seagoing engineer, two wrestlers, two barbers, a cigar maker, a racehorse man, a bricklayer, an undertaker, a deep sea diver, six old maids, a milliner, and a professional gambler." Apparently farming is like writing in this, that every man thinks he can do it, and so do some spinsters, without preliminary experience or training. I venture to doubt that wrestlers, deep sea divers, milliners, and circus musicians are precisely fitted to meet farm problems. The Romans despised the man who plowed a crooked furrow; he was called a "prevaricator."

But this is a niggling criticism. By and large our farm families constitute an intelligent and sturdy segment of our population. It is more to the point to say that, while agriculture has more power available per man than any other industry excepting transportation, and more than all the manufacturing industries combined, many farm operations are still manual, and less power actually is used per worker than in any other industry. The cotton stripper, which has reduced the cost of harvesting that crop by ten dollars a bale, is too little used. Mechanical cotton pickers promise to prove successful and may start another negro migration into industrial centers, by throwing field men and women out of work. Our farmlands are far from being mechanized, or from enjoying the concomitants of modern industrial methods, which include economical and efficient management, as well as the application of scientific research.

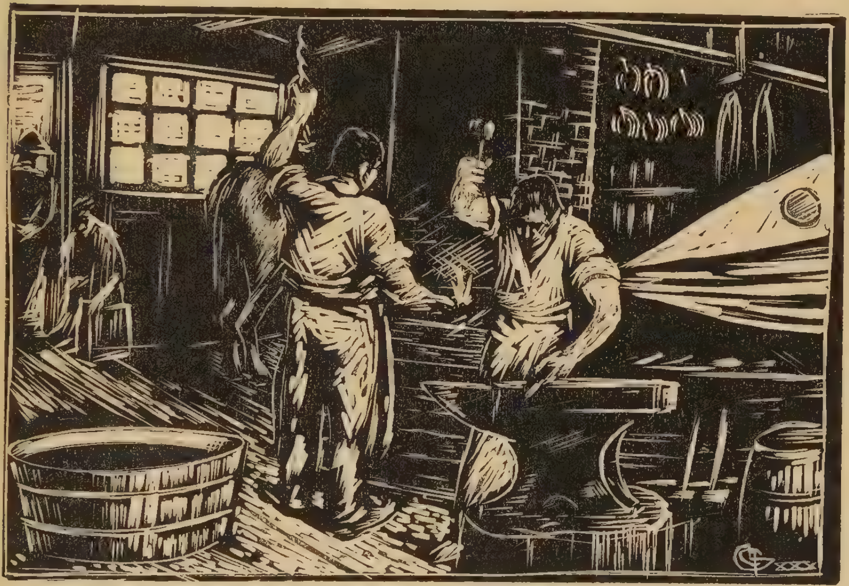
The farm problem includes, moreover, costs of transportation and inequitable rewards for labor. Let us suppose that a farmer near Springfield, Illinois, and another near Oklahoma City wish to buy from a midwestern manufacturer a gang plow, a corn binder, a grain harvester and a wagon. Just before the World War the Illinois purchaser would have paid $414, the Oklahoma farmer $484.50, the difference being in transportation charges. In 1921 the Illinois farmer would have been required to pay $700, the other $751. Translated into corn, this would have meant for the Illinois man in 1913 only 716 bushels, as against more than 2,000 bushels in 1921; and for the Oklahoma farmer 931 bushels as against more than 4,000.

Aside from the market fluctuation in the price of corn, it should be borne in mind that in 1913 the Springfield farmer paid $32 freight to move a carload of corn to Chicago, whereas in 1921 he paid $187. The Oklahoma City farmer paid in 1913 $130.44, as against $1,112.06. Railroad labor, occupied perhaps twenty-four hours on these tasks, received 14 cents per bushel, on an average, for its work, as against 17.5 cents to the farmer for practically a year's labor.

Is it surprising, then, that the thoughtful farmer is beginning to feel toward the railroad systems something of that bitterness which animated his political outlook in the '80's of the last century? Yet it is not the railroads, I think, which are chiefly to blame. The fault lies with the Interstate Commerce Commission, oldest and most cumbersome and inefficient of that whole congeries of bureaus which has grown up in Washington to make mock of democratic processes. The Interstate Commerce Commission, it may be asserted with safety, is even worse than the Tariff Commission, although we have heard much more about the latter. Both of them serve as damaging counts in the indictment against Federal bureaucracy.

Farmers are notoriously individualistic. Let us note the case of Mr. Cornfield. He knows what he wants when he wants it. He prefers a left-hand plow, for example, because he has a notion there is some mystic virtue in a furrow turned to the left instead of to the right. When he buys a wagon he insists on making his selection from twoscore styles of hind gears, half a dozen wheel heights and a tire width precisely to his liking. He is just as finicky about harrows and rakes and seeders and grain drills.

Now, the whole tendency of the Machine Age is away from multiplicity of types and styles. Mr. Cornfield deals with an implement house which deals with a jobber who buys most of his farm implements from a farm equipment manufacturer fully aware of this basic fact. He is making some drastic changes in his plant methods, and has reduced the different styles of hind gears on his farm wagons from fifty to eight. He has reduced the number of wheel heights from five to three. He has reduced the number of tire widths to six, instead of making any width desired by a customer. He has quit altogether making left-hand plows. He has, in fact, reduced the sizes and styles of his steel plows from about three hundred to less than one-fourth that number. He has gone right through his factory, simplifying processes and eliminating what was intended merely to gratify whims without increasing utility.



Of course Mr. Cornfield is outraged. He vows he will quit dealing with the implement house. He has a big farm, and purchases on a large scale, so the retailer takes the matter up with him in person.

"When you bought a left-hand plow," he explains, patiently, "it not only cost you more, but it made right-hand plows cost more for the men who bought them, and most farmers prefer that kind. I had to carry a bigger stock in order to supply what you wanted in plows and wagons and so on; and my jobber had to carry a bigger stock, and the manufacturer had to carry a bigger inventory. Because I had more stock I had greater depreciation and storage space cost me more. I had to pay more for handling the things, and my salesmen had less time to devote to you customers. So that it meant a big saving to me when this line was cut down, and it meant a bigger saving to the manufacturer. He sent me word that the economy on wagon lines and tillage tools alone was thirty per cent., and that it was ten per cent. on other implement lines; and on that basis the decrease in inventory in the implement business in the United States would amount to fifty million dollars. You can see for yourself that at six per cent. this means a saving of three millions annually.

"Maybe you are wondering where you come in on this. I'll tell you. It is because of these savings that prices on farm equipment haven't advanced recently to higher levels. The factories saved money on dies and inventories and so on, and got longer runs on parts of the machines they were making, and got better work out of their men, and you got the benefit. You remember when your boy Sam came home from school—you told me the story yourself—you said to him that his rah-rah suit cost too much, and made fun of him to boot. Well, here you are asking for a rah-rah plow and willing to pay more for it than any plow ought to cost."

Only the name of Mr. Cornfield is imaginary in that skit. The conversation is reported as it was told to me, and the figures cited are facts. That particular farmer saw the light, and foreswore his weakness for left-hand plows; but his fellows have not all been so ready to perceive the advantages of standardization. There seems to be no great difficulty in ironing the kinks out of city-bred men, and regimenting whole communities into the Arrow-collar type; but the farmer, spending much of his time alone between earth and sky, rejoices in being different, and is proud of the raw edges of his personality. His son, who may have attended an agricultural college—the first in this country was established in 1857—is more amenable to the sameness which is one of the prices of mechanical economies.

The son is likely to be less intolerant, too, of the chemist, the government's county agent, the highbrow expert on soils, the engineer and the mechanic. He is likely to take somewhat more kindly to business methods, and to view without shuddering a system of cost accounting. These things, be it known, go along hand in hand with modern industry and with mass production; and the farmer was the first to engage in mass production, selling at wholesale and buying at retail. What we know as the "farm problem" is largely a problem of mechanized equipment, partly a problem of credit, and partly a problem of management. As for credit, that has been fairly well attended to since 1910. Federal reserve banks may now discount "eligible" agricultural paper for nine months, whereas the merchant gets but ninety days; there are Federal land banks, and coöperative credit unions.

V

The question of credit taught the farmer something about modern business methods, as affected by the machine; coöperative marketing and purchasing organizations taught him even more. In 1928 there were 11,400 of these organizations, with two million farmers as members of one or more of them. The Department of Agriculture reported that they were "incomparably better managed business organizations than they were ten years ago." But their membership represented less than one-third of the active farmers in this country. Their total coöperative turnover amounted that year to $2,300,000,000, whereas the total wealth brought out of the fields was close to ten billions. Senator Capper was right when he said that the rural districts had "made only a start" in solving their selling problem.

The purchasing and selling problem comes in bald figures down to this: that on the basis of the 1910-1914 dollar as par, the farmer received in 1928 for his output at the rate of $1.31, whereas he paid for commodities he purchased at the rate of $1.54. And of the dollar paid by the consumer for the output, the farmer received on an average only thirty cents. Seventy cents went into that complex of services known as distribution;

and although distribution has been marvelously facilitated by the machine, the costs of warehousing, transportation, insurance, jobbing and so on has greatly increased. Through coöperative action the farmer may hope to bring production and marketing into line; more, he may expect through the grading of coöperative commodities to get a fair return for the excellence of his output. Thus he may learn in time to avoid overproduction, to standardize packing and quality, and to eliminate the waste and lost motion between him and the consumer. In that direction, and not in the resort to artificial economic palliatives, lies the solution of his problem.

In that direction, and in the greater employment of the machine, lies the solution. In 1909 the value of agricultural implements manufactured in the United States was $146,329,268, an increase of 44.6 per cent. since the beginning of the century. In 1927 the value of these implements was $460,881,111, of which $391,868,822 worth was sold in this country, the balance going into export. The biggest item was tractors, for which our farmers spent $131,667,221; the next was harvesters, for which they spent $38,823,209. This represented, like the coöperative movement, "only a start"; but it was a pretty good start.

Nor was the farmer so deeply plunged into debt as many supposed. In 1925—I am able to find no later figures—the value of farm properties, land and equipment, was more than fifty-seven billions, and the mortgages were only a little more than four and a half billions. These figures took no account, of course, of book credits with merchants, nor of notes discounted at the bank. Indebtedness of that sort fluctuates so rapidly that it cannot be calculated fairly on an annual basis. It is seasonal, and reaches its peaks at the times of planting and crop-moving.

This is not to deny, of course, that the number of insolvent farmers is disquieting. A survey of sixteen farms in Minnesota, Wisconsin, South Dakota and North Dakota, for example, proved depressing, although the group was above the average. All but four of the owners had been born on farms; the average size of their holdings was 388 acres, which was at least half as large again as the average farms in those States, and the acreage which they devoted to soil-building and to combating weed crops was from two to five times as great as the average in their States. One might suppose that they were prospering. Compared with the average, they were. They had actually earned about 5 per cent. on their investment over a five-year period. On the whole, they had farmed, each of them, a quarter of a century, and knew their business; they had an average investment of $47,000; all were married, and the average of children was five. Sound, well-to-do American farm families!

Now let us see about their standard of living. Two of the sixteen had no water systems in their homes; only thirteen had electric lights—the other depended on gas; only thirteen had bathrooms; fourteen—this speaks well for the group—had power washing machines; and all of them—this says still a better word—had libraries, current periodicals, daily newspapers and musical instruments. All their children had been through high school, and on an average one child in every family was attending college or had taken an academic course.

This was an exceptional showing, made by a hand-picked group. One may be surprised that these men were content with a five-per-cent. return. The answer, as given by Roy Johnson of Casselton, North Dakota, one of the instigators of the survey, is that men stay on the farm "through the love and enjoyment of an independent country life, the pleasure of rearing children on the farm, and the desire to improve and hand down what has come to them from the preceding generation."

All too few farms, obviously, enjoy the advantages of electricity and the radio. The National Electric Light Association reports that in 1923 only 165,000 of them were getting service from light and power companies, in 1926, 227,500. "If this increase continues at the same rate," the report said, "there will be approximately one million electrified farms in the United States by the end of 1932, and by the end of 1938 this number will be increased to approximately three millions, which is nearly equal to one-half the total farms in this country." Only half! It is a commentary on the costliness of electric service when distributed through sparsely settled communities and areas.

VI

If all too few farms enjoy the advantages of the dynamo, all too few farmers realize what other machinery can do for them. Consider, for instance, the corn crop, which takes our greatest acreage, and has an annual value close to two billion dollars. (We import less than a million dollars' worth of corn, and export less than one-fifth as much.) The farming community spends from three hundred to four hundred million dollars annually in harvesting this crop from one hundred million acres; and no crop illustrates better the disparity between manual and machine labor, or the wastefulness of agriculture, which is our most wasteful industry.

With a two-row tractor planter, the farmer can cover twenty-four acres a day; with a four-row planter he can cover forty-six acres; by hand he can cover but five. With a two-row cultivator, traveling four miles an hour—the speed of a fairly lively pedestrian—he can cover thirty-three acres daily; with the four-row cultivator, sixty-five. Picking corn by hand, he can cover one or two acres a day, depending on the yield of his land; with an automatic corn picker and husker, he can cover eight or ten.

Picked by hand, the cost of harvesting corn runs from fifteen to twenty cents a bushel, with labor at the usual levels; the corn is shocked in the field, the shocks are laboriously tied together and left to stand until they have dried; later they are spread upon the ground, the ears of corn are picked, husked and thrown into piles; the stalks are bundled and hauled to the barn, perhaps to be shredded for fodder; and the ears of corn are gathered into baskets, dumped into wagons, hauled to the crib and shoveled into it.

The up-to-date farmer in the midwest corn belt husks his corn from the standing stalks, throws it by machinery into motor trucks, hauls it to the crib and dumps it into an elevator driven by an engine. Fewer men are needed, and the cost of the whole operation is cut in half. With such equipment, the hardship of picking ears from wet or frozen stalks is averted. What the farmer does is to drive a team of horses or a tractor.

But those corn stalks: more than 100,000,000 tons of them go to waste every year. What can the chemist and the machine-manufacturer do about that?

Well, the pith of the corn stalk is almost pure cellulose, and Dr. O. R. Sweeney, chemical engineer in the Iowa State College of Agriculture, is authority for the statement that three thousand different commodities, already duly catalogued, can be made from corn stalks and corn cobs. Lumber substitutes can be made from them, ranging from a cork-like material to stuff as tough as hickory. Nuts and bolts can be made from the stalks; from the cobs, furfural, an antiseptic and disinfectant which costs but nine cents a pound, and is susceptible of use as a motor fuel. Hair combs, rayon, paints, photographic films, composite boarding for the interior and exterior of houses, explosives, paper cartons, and newsprint can be made of these stalks.

Already paper has been made from corn stalks for magazine use, newspapers, wrapping and bags. The process was patented by Dr. Bela Dorner of Hungary. In October, 1928, the first carload of corn pulp was made into paper by the Kalamazoo Vegetable Parchment Company; on the following December 15 the *Prairie Farmer* ran off an edition of a quarter million copies on this paper, and it was not long before Dr. George M. Rommel's book, *Farm Products in Industry*, was printed on it. When we remember that in ten years the paper consumption in the United States very nearly doubled, to reach a total of twelve million tons, and that the forests of spruce and hemlock which have been our main dependence for pulp heretofore are receding constantly, it is easy to draw glowing pictures of the future in store for this waste product of the farm. It takes about three tons of stalks to make a ton of paper; and enough stalks are burned in a single year to afford raw material for the whole paper market.

The operation, however, is not quite so simple as may appear from this statement. Its success, and a rich by-product revenue to the corn-grower, depend finally on the machine. With the apparatus now available, the cost of gathering the stalks and transporting them to a pulp-mill is so high as to make competition with wood-pulp difficult. The pulp company may harvest the farmer's corn for him and take the stalks in payment, but in order to do that it must be able to deliver the stalks into the mill at the rate of ten dollars a ton, if it is to be on a par with the paper-maker from wood. At present this is not always practicable. Hard roads and motor transport help meet the situation, but what is imperatively needed is new machinery which will harvest the corn and collect the stalks more economically. That success will reward the fine engineering and inventive minds which have tackled the problem none of us can well doubt. Cotton seed were a waste product not so long ago; now the annual saving from this by-product runs well past a quarter of a billion dollars. When corn stalks are utilized as profitably, the farmer will cease, through his agencies at Washington, to cry for preferential tariffs or the pulmotor of governmental subsidies.

It is true enough that the farmer has sold in a world market, and has bought his manufactured commodities in a protected market. Tariffs, although they antedated the fruition of the Machine Age (the first Congress of the United States passed a tariff act), have been developed hand in hand with mass production. They are held accountable by many protectionists for the status of modern industrialism. But if we glance back at the figures cited for the imports and exports of the corn crop, it is difficult to perceive how any tariff, even though prohibitive, can operate to affect prices there, and an examination indicates the same thing of the other major crops. Our imports of wheat, for example, run to only a fraction more than 6 per cent. of our surplus production. At least 93 per cent. of the surplus, that is to say, must be sold in the world market. How can our tariffs affect world prices?

Tariffs are a highly controversial topic, and perhaps I would better let them alone. But to me it does seem that transportation, mechanization, and modern industrial methods of management are more important in trying to put agriculture on its feet than any political expedient. Freight rates are no small part of it, and will be an important factor so long as the Interstate Commerce Commission continues to exercise its vast powers as it does at present. There seems to me no question that the farmer pays a discriminatory and unjust share of the revenue required to maintain automatic transportation systems in this country. The situation could be mollified by the Interstate Commerce Commission if it chose; probably it will not be relieved until the plan suggested by Herbert Hoover, when Secretary of Commerce, is adopted. Mr. Hoover proposed the development of an inland waterway transportation system, to put not only the farmer but the inland manufacturer on an even footing with coastal producers. With that club in his hands, the farmer could bring both the railroads and the Interstate Commerce Commission to terms.

VII

When Edwin E. Slosson first turned his attention to the farmer's plight, he was puzzled. Here was a producer who had free raw material at hand, whose water and power were delivered continuingly to him free of charge, and whose commodity everybody must buy, and yet he wasn't making a go of it. What the farmer really sells is dirt and air, as Dr. Slosson pointed out—one per cent. of dirt and ninety-nine per cent. of air, combined "in attractive and appetizing packages." Of the ninety-two chemical elements the farmer uses the four cheapest, nitrogen, hydrogen, oxygen and carbon, all of which he takes free from the atmosphere, without slagpiles or waste products. The oxygen and hydrogen he gets from rain, the nitrogen from the air, and the carbon from the air in the form of a dioxide. The necessary chemical reactions and transformations go on in the plant laboratories; and the necessary energy is supplied free by the sun. Dr. Slosson calculates that every farmer receives on a clear day some fifty thousand horsepower on each acre, but on further examination he found that only one per cent. of this was utilized. He tried to picture a manufacturer, accustomed to utilizing about ninety-five per cent. of the power generated, as being contented with one per cent.! The heating value of the sunshine on one acre he estimated as equal to two hundred and forty-three tons of anthracite, but the twenty-five bushels of corn the farmer might raise on that acre would buy only one-third of a ton of hard coal. And if he fed the corn to a steer, its meat would be reduced in caloric value to about sixty-six pounds of coal.

Yet this paradoxical situation must continue as it is, until some one learns how to utilize the energy from sunshine to better advantage than the plant leaf. It is possible to produce sugar synthetically from coal and water, for example, but the process is so complicated and costly that man can never compete with sugar cane, in all probability, extravagant as nature's laboratory may seem. Dr. Slosson concluded that the chemist could never compete with the forest and the cornfield in the production of cellulose, which is the material industry is hungry for just now. The answer must be found in gasoline and electric power, the latter perhaps supplied from central stations. The farmer has never had the advantage of using natural fuels to any great extent, nor has he adapted the factory system to his business. Coal, petroleum and gasoline have given to agriculture as yet but secondary service, and scientific management has but touched our smiling fields.

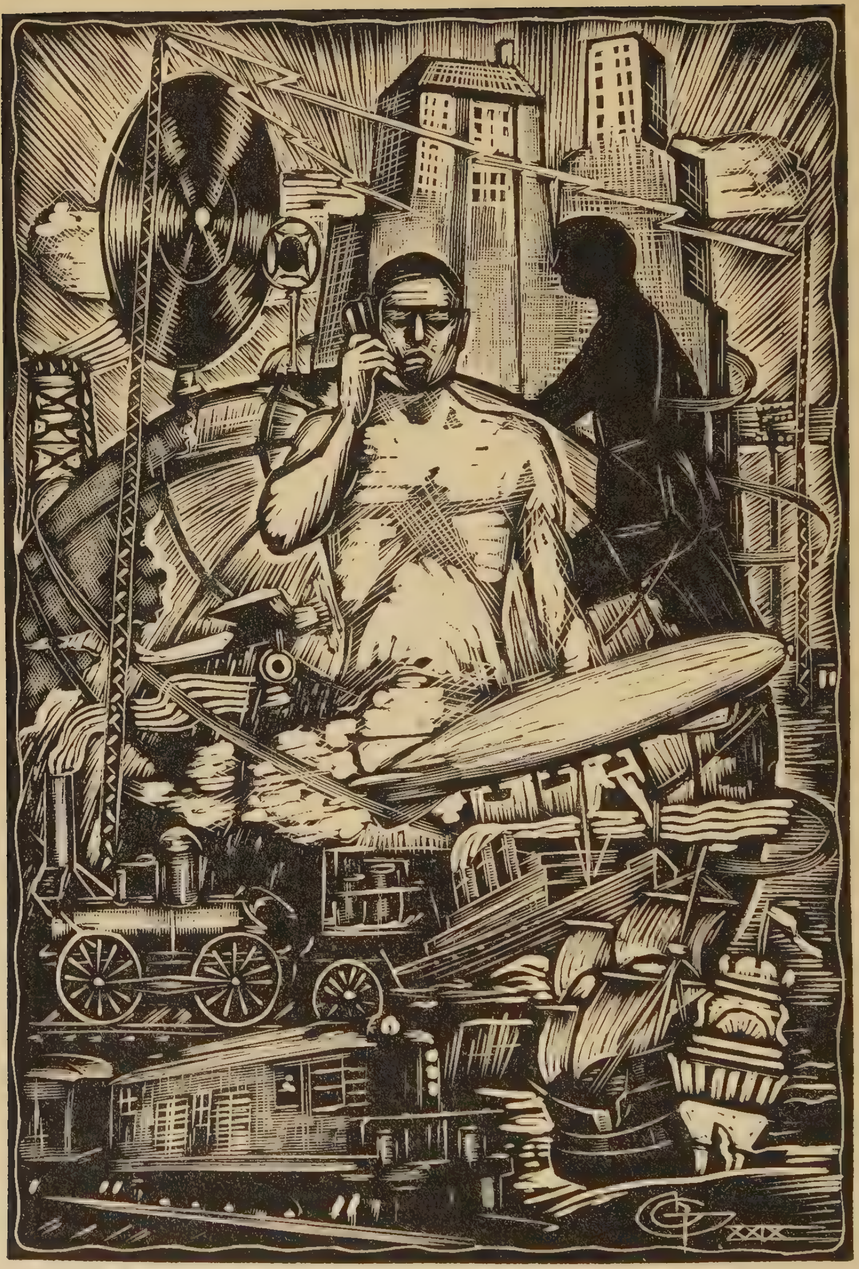
During the last half century, nevertheless, greater progress has been made in the development of power for the farm than during all the history of the world heretofore. With the possible exception of Switzerland and Scotland, this country has the most intelligent agriculturists anywhere. They are far removed from peasants, although some economists denominate as "the peasant type" those whose families perform all the manual labor about the place. When one considers their individualism and their competitive isolation, the readiness with which they are taking over the machine seems remarkable. Even the iron plow was not in general use until 1842. As late as 1880 the value of farm implements in actual use was only $407,000,000. In 1830 it required 64 hours and 15 minutes, with an investment of $3.71 in cash, to harvest an acre of wheat; before the end of the century the time had been reduced to 58 minutes, with an investment of 72 cents. As for oats, in 1830 the investment per acre in time and money was 66 hours and 15 minutes, plus $3.73; by 1893 it had been reduced to 7 hours plus $1.07. Since then, as we have seen, still further reductions have been accomplished. Almost until the turn of the century, farming was not merely a matter of tilling the soil; it was also the chief manufacturing industry in the United States. We had 5,740,000 farms, embracing 841,200,000 acres, and most of them were self-contained units, providing their own food, shelter, and fuel. The growth of the factory system meant that the business of making clothes, for example, was taken away from the farmer, just as bread-making was taken away from the housewife. Thus to-day we have 10,000,000 persons gainfully employed, and 28,000,000 persons dependent, on agricultural processes alone. About one-fourth of our population, exercising a vast influence on our purchasing power as a nation, give to the "farm problem" its importance in our economic and social life.

We may glimpse the farm of the future by looking at what is being done now on some farms scientifically operated. Thomas B. Campbell, for instance, who has charge of that Montana tract of which I have spoken, took to it an engineering mind. During the World War, instead of serving as a dollar-a-year man, he was induced to put into wheat a part of the Crow Indian Reservation, and subsequently raised a million dollars to finance a farm there. He has fleets of automobiles and trucks. He raises a few pigs and chickens for home consumption, but regards them as rather a nuisance. He has incorporated his enterprise, and has given 20 per cent. of the stock as a bonus to skilled workers. This is a long step forward. One handicap of the farmer is that he does not issue stock, whereby partnership and its responsibilities are readily divisible; nor bonds, whereby indebtedness becomes readily divisible. These are devices from which Big Business has profited enormously.

In Indiana there are two small farmers, each with 80 acres, each cultivating the same sort of soil (for their tracts adjoin), each with the same rainfall and sunshine; yet in 1927 one of them cleared $1,676, while the other found himself $198 in debt. This disparity was due, according to Robert Stewart, dean of the College of Agriculture at the University of Nevada (to whom I am indebted for these illustrations), to the fact that the more prosperous of these men uses machinery and scientific methods.

Arthur J. Mason, whose farm is at Flossmoor, Illinois, like Mr. Campbell, took to the fields an engineering mind. His great contribution has been the development and invention of machinery for harvesting alfalfa, a sod-producing and soil-enriching plant. He gets from 2,000 to 3,000 tons a year from a 600-acre tract, averaging 4.2 tons an acre while the average for that State is but 2.7 tons. In part this record is due to his invention of a special type of mower with an elevator which delivers the hay to trucks; the trucks deliver the hay to an artificial dryer, where it is mechanically unloaded onto moving belts; and forty-five minutes later it is finished alfalfa meal for feeding to stock. The plant to accomplish this cost $21,000, and appears to be a good investment; for Mr. Mason spends $9 a ton for a stock feed which he sells in the eastern market at $38 a tone, leaving him a handsome profit after transportation and overhead have been accounted for. His methods in raising and harvesting alfalfa have been adopted by some of the big dairies in the East—a step toward "vertical" production!

Now, although our annual wheat crop is twice as valuable as all the gold produced in a single year, we average but fourteen bushels to the acre. Germany and Great Britain average thirty-two bushels, France twenty, Canada and Rumania nineteen; only Russia, of the great producing countries, lags behind us with an average of twelve bushels to the acre. Yet every year, excepting in 1836, the farmers of this country have produced a surplus of this grain, and it has been necessary to sell the surplus at the world price. To the efficient producer a surplus has no terrors. His problem is already solved. The tendency of the surplus is merely to eliminate the footless and ineffectual producer—either that, or to convert him to the machine system, where lies his salvation.


XXIX

CHAPTER SEVEN

COMMUNICATION: From Bamboo Pen to Rotary Press

I

IF any one had said, at the beginning of the Twentieth Century, that a modern Magellan would encircle the globe in some twelve days' traveling time, the assertion might have been received with some credence. But if he had said that, whether over the Siberian wastes or the vasty deeps of the Pacific, Dr. Hugo Eckener would maintain constant communication with the civilized world, and even gossip casually with an explorer at the South Pole, there is the probability that a sanity inquest would have been demanded. "The development of aviation and wireless and modern methods of communication," says H. G. Wells, "has been ten times as rapid as any prophet dared imagine in 1900."

This giant Zeppelin, stopping but four times for food and rest, encircled the earth in the time Marco Polo and his caravan, five centuries earlier, spent traversing some two hundred miles. The crew sold in Chicago the silks of Cipango less than one hundred hours from the weaver's loom. Man has now achieved, in the airplane, the well-nigh incredible speed of six miles a minute, whereas at the beginning of the century we gasped at sixty miles an hour. But man has dreamed about flying since the dawn of history, and nothing the modern Dædalus does can astonish us quite so much as the prankish and miraculous things he does in sending his messages to distant points in split-second time. This is something until recent years undreamed of in his philosophy; this is something new under the sun. We take it almost for granted now that an auditor in San Francisco hears London music actually before the audience in the London concert hall gets the sound waves through the air. Twenty-five years ago we could not have believed it. Yet the discoveries that paved the way for wireless date back nearly a century, which is a long while in a whirling Machine Age.

Contrast the miracles of modern communication with the methods in use when one human intelligence could reach another only through gestures or the spoken word. The first permanent organization of primitive man was a courier service, and a mounted courier took to the English Channel the tidings of Napoleon's defeat at Waterloo. At first tested runners were employed, fleet of foot and long of wind; then domesticated animals, camels and horses, were pressed into service. For short distances, it is true, signals could be transmitted from hilltop bonfires and by flashes from mirrors of burnished metal. Part of Sing Sing prison stands on an eminence once used by the Sinck Sinck Indians for that purpose. But it was not enough to send orders, warnings, news or other messages by signal, gesture or word of mouth; restless mankind began drawing pictures.

The first cave man to draw a picture of his encounter with a bear presumably got a great kick out of it, without realizing what he was doing for posterity; for out of that picture grew the ideograph, still a form of communication between the Chinese, the Japanese and some other peoples; out of that came the hieroglyphic, and from that the alphabet. The Chinese, who invented printing more than a millennium before Europeans learned the art, at first utilized for pens slim bamboo reeds. They made bamboo serve as the pages of books, food, medicine, building material and furniture, baskets, a wood pulp for paper, water buckets, bottles and cooking utensils, and as a secret container for the eggs of silk worms, the progenitors of Europe's numerous colony, on a journey to Constantinople. "One of Nature's most valuable gifts to uncivilized man," some one has called bamboo; and nowhere has its value been proved more conclusively than in its utilization as an instrument of communication. The word communication is being used here in its commoner sense, as indicating the interchange of ideas, experiences and emotions.

The Chinese bamboo pen had a successor, among the Assyrians and then among the Phœnicians, in the stylus, with parchment or clay tablets. Scientists digging in the great Temple of Tanit at Carthage found, on the bottom of a clay lamp, characters which they deciphered as follows: "Why not buy our lamps? They are the cheapest in Carthage." The price was there, too—one drachma. In the sepulcher of an ancient civilization was the germ of that advertising which helps to make possible our modern industrialism. Theaters of that day advertised with clay masks, hung alike in temples and in cabarets. The art of angling for potential customers and creating wider markets did not await the elaboration of the machine; it began with the tool. The merchants of Nineveh and Tyre kept their accounts on clay tablets, and on such tablets were letters transmitted.

II

Primitive motives and emotions have their part in letter-writing and letter-reading. It is quite possible that the merchants of Nineveh used a vocabulary as extensive as that of the modern business man. A professor at Johns Hopkins made a survey which convinced him that many business men "write their routine letters with a vocabulary of four hundred words." An unabridged dictionary contains a thousand times as many. The lexicographer of one of them asserted, replying to the professor, that "lawyers, doctors, merchants and chiefs are familiar with, if they do not use, from eight thousand to ten thousand words outside their professional cant."

Returning now to our neglected Chinese, let us see how they came to hit upon printing. Dr. Thomas Francis Carter, who formerly taught Chinese at Columbia University, has painstakingly traced, in *The Invention of Printing in China and Its Spread Westward*, the successive slow steps whereby the Orient gave Europe this invention and the manufacture of paper. As a fact, the use of paper is an essential of printing, and was the more fully developed in China. Paper of rags, hemp, plant fibers, cellulose, sized and loaded to improve its quality in taking inks and colors, paper of different colors, wrapping paper, even paper napkins and toilet paper, were in common use there during the early centuries of the Christian era, a thousand years before printing was known in England. Chinese prisoners taught their Arab conquerors the secrets of manufacture at Samarkand, in the Eighth Century, and the Arabs relayed it to the Moors, who helped the Spanish conquer them in the Twelfth and Thirteenth Centuries. Even now the Chinese are leaders in this field, and in recent years have devised, as Dr. Carter reminds us, both papier mâché and thin India paper, so-called.

Until 225 B.C. the Chinese wrote with their bamboo pens upon slips of bamboo or wood. They valued the bamboo more highly, because the strips could be bound together at one end into a book. The ink they used was made from tree sap. In the Third Century B.C., General Meng T'Ien is credited with having invented a writing brush made with hair, and silk supplanted wood as a carrier. Silk, however, was expensive; and Dr. Carter quotes from the official Han Dynasty history, written by Fan Yeh in the Fifth Century A.D., in part as follows:

> During the period Chien-ch'u [A.D. 76-83] Ts'ai Lun formed part of the Imperial Guard. The emperor Ho Ti, on coming to the throne, knowing that Ts'ai Lun was a man full of talent and zeal, appointed him privy counselor. In this position he did not hesitate to bestow either praise or blame upon His Majesty.
>
> In ancient times writing was generally on bamboo or pieces of silk, which were then called chih. But silk being expensive and bamboo heavy, these two materials were not convenient. Then Ts'ai Lun thought of using tree bark, hemp, rags and fish nets. In the first year of the Yuan-hsing period [A.D. 105] he made a report to the emperor on the process of paper making, and received high praise for his ability. From this time paper has been in use everywhere and is called the "paper of Marquis Ts'ai."

But this world benefactor, for all his ingenuity, could not keep out of palace intrigues; and when summoned to appear before the judges "he went home, took a bath, combed his hair, put on his best robes, and drank poison." At any rate he quit the earthly scene with greater dignity and composure than Sir Walter Raleigh, who gave us tobacco but succumbed—bravely enough—to the headsman's ax.

Ts'ai Lun's title to the invention of paper is verified by a document found in 1907 by Sir M. Aurel Stein and now cherished in the British Museum. A mendicant Taoist priest, "restoring" one of the Caves of the Thousand Buddhas near a Kansu watch tower of the Great Wall, had discovered a secret chamber nine feet square, piled with manuscripts. Dr. Stein, visiting it seven years later, concluded that it had been walled up about the year 1035, to prevent its contents from falling into the hands of enemies; and he found the manuscripts within, preserved by the dry climate of Turkestan, in almost perfect condition. There were eleven hundred and thirty bundles of them, each containing a dozen or more rolls of manuscript, and among them are nine letters and a book of selections from the Old Testament in Hebrew. Another book of six sheets of text and an illustration is held to be the oldest ever found. It is dated as having been printed May 11, 868, by Wang Chieh, "in order in deep reverence to perpetuate the memory of his parents." But the nine letters, one of which Dr. Stein took to the museum in London—with many other documents—were written on paper some time within the first fifty years after Ts'ai Lun's invention. After a second expedition, in 1911, Dr. Stein laid samples of the earliest paper before Dr. Weisner, whose microscopic examination showed it to be pure rag paper. Until 1885 rag paper was supposed in the western world to be a European invention of the Fifteenth Century; from then until 1911 it was supposed to have been invented, in the Eighth Century, by the Arabs of Samarkand. Now it was carried back and duly credited to the Chinese of the Second Century. No longer was it held that the Flowery Kingdom had been a separate compartment of the world, hermetically sealed against the issue of its discoveries and inventions to the west.

The paper used by the first printers in Europe differed very little if at all from the rag paper the Chinese taught the Arabs to make. The Chinese perfected their invention before they began printing from wooden blocks.

III

Many persons regard block printing as a mere preliminary to typography, in which movable type is used; but movable types imply an alphabet, which the Chinese have not acquired to this day. With some forty thousand separate symbols to designate words, the use of separate pieces was an audacity. It is true that Chinese invented movable type, but it was Japan and Korea chiefly which made use of them. The printing which brought a Renaissance during the Sung Dynasty was printing from blocks. Feng Tao, who greatly improved the process, is revered in the Far East as Gutenberg is honored in Europe.

As for the ink the Chinese used, the French accurately speak of it as *encre de Chine;* we blunderingly call it India Ink. True ink as we know it was not made from lamp black by the Chinese until the Fourth or Fifth Century. It made a clear, almost indelible, impression from wooden blocks, but was of little use with metal type. Thus European ink-makers dissolved a pigment in oil. But Buddhist priests in the Siberian plains still carve their prayer boards, from which devout followers may obtain copies of such supplications as they desire. I have one of these prayer boards, handsomely engraved on each side, but it has descended from devout to decorative uses.

It was a radical thinker, blessed with knowledge of an alphabet, who conceived the idea of putting each character on a separate piece of wood or metal, instead of all together on one slab, and thus gave the world movable type. Although a disputed point, the credit goes as a rule to Gutenberg. Out of the invention came the printing press and an unexampled spread of literacy, until then confined to the clergy and the gentry. The early books of this world, indeed, have been without exception, among all peoples, religious volumes.

Lest there be some question as to whether the Chinese anticipated Gutenberg in the use of movable types, let me quote from the writings of Shen Kua, whose veracity and accuracy have not been challenged. He lived during the Sung Dynasty, 960-1280, which succeeded the T'ang era. "While the T'ang Dynasty (618-907) has a freshness that reminds one of the Elizabethan Age," says Dr. Carter, "the time of the Sung Emperors has a polish, a love of system and a scientific spirit that is essentially Victorian. The Sung mind was that of the modern man." Hear, then, Shen Kua:

> Under the T'ang Dynasty block printing, though carried on, was not fully developed. In the time of Feng Ying-Wang (Feng Tao), first the Five Classics and then in general all the ancient canonical works were printed.
>
> During the period Ch'ing-li [1041-1049] Pi Sheng, a man in cotton cloth [i.e., a man of the common people] made also movable type. His method was as follows: He took sticky clay and cut it in characters as thin as the edge of a cash. Each character formed as it were a single type. He baked them in the fire to make them hard. He had previously prepared an iron plate and he had covered this plate with a mixture of pine resin, wax and paper ashes. When he wished to print, he took an iron frame and set it on the iron plate. In this he placed the type, set close together. When the frame was full, the whole made one solid block of type. He then placed it near the fire to warm it. When the paste [at the back] was slightly melted, he took a perfectly smooth board and rubbed over the surface, so that the block of type became as even as a whetstone.
>
> If one were to print only two or three copies, this method would be neither convenient nor quick. But for printing hundreds or thousands of copies, it was marvelously ["divinely"] quick. As a rule he kept two forms going. While the impression was being made from one form, the type was being put in place in the other. When the printing of the one form was finished, the other was all ready. In this way the two forms alternated and the printing was done with great rapidity.
>
> For each character there were several type, and for certain common characters there were twenty or more type each, in order to be prepared for the repetition of characters on the same page. When the characters were not in use, he had them arranged with paper labels, one label for each rhyme, and thus kept them in wooden cases. If any rare character appeared that had not been prepared in advance, it was cut as needed and baked with [a fire of] straw. In a moment it was finished.

> The reason he did not use wood is because the tissue of wood is sometimes coarse and sometimes fine, and wood also absorbs moisture, so that the form when set up would be uneven. Also the wood would have stuck in the paste and could not readily have been pulled out. So it was better to use burnt earthenware. When the printing was finished, the form was again brought near the fire to allow the paste to melt, and then brushed with the hand, so that the type fell of themselves and were not in the least soiled with clay.
>
> When Pi Sheng died, his font of type passed into the possession of my followers, and up to this time it has been kept as a precious possession.

This narrative not only has cogency and persuasiveness; it appears to be the story of an eye-witness to printing from movable types nearly a millennium agone. It is a fascinating story to any one who ever has worked over wooden type cases, or seen type placed in metal chases not unlike, it may be supposed, the iron frame Pi Sheng used, or heard the roar of our modern multiple rotary presses. The Chinese progressed, in fact, from earthenware type to tin and wooden type; they even invented what our printers call the column rule. They set up revolving tables so the compositor could get his type without walking about seeking for what he wanted among forty thousand units. It seems carping to remind ourselves that the amazing pioneers did not devise a type mold, alphabetic characters, or a press. The type mold, to be sure, was invented for metal ideographs, half a century before Gutenberg thought of it; the others are clearly European achievements. Great Britain and the United States, which to-day do the bulk of the world's printing, can take no credit for early inventions in that field. Their contribution to the spread of literacy has been the application of artificial power to the old hand press and the invention of automatic type-setters. Their contribution, in other words, has been distinctly of the Machine Age.

IV

When printing reached England, in the Fifteenth Century, the hand dodger, the tract, and the pamphlet sprang into existence. Prose freed itself of poetic license, and the population was able to learn something of life in the streets and taverns, life among the workers and the lowly, instead of being limited in their interests to the colorful but oblique view prevailing in the court. Robert Greene was one of the first to make this social extension apparent in his writings, and one of the first Englishmen to earn a living by writing. In *The Renaissance* Professor Robert L. Bolwell tells us:

> He wrote numerous pamphlets on the iniquities of London's underworld, and an interesting series of confessions about himself. Although it may be unfair to describe his tracts and pamphlets as journalism, written with an eye to good copy and large sales, he did, nevertheless, capitalize his own weaknesses and the life of his literary group in a brilliant way.

In Greene, then, we have the man who set the pattern for the pulpwood "confession" magazines which encumber our newsstands, and for that august Boston monthly which, with suitable toploftiness, is not averse to super-confession stuff in its own columns. (It is impossible to be shocked now at anything that happens in Boston.) He set the pattern, too, in his literary gossip, for the *American Mercury* and the *New Yorker*, big brother and little sister among the flippant monthly and weekly periodicals. But Greene had a more important function. He was a precursor of Addison and Swift and Defoe and Milton, and an immortal company of pamphleteers. The *Areopagitica* first appeared as a pamphlet, and no more eloquent plea for the freedom of printing ever has been penned.

So long as the bamboo reed in China, the stylus in northern Africa and the quill pen in Europe were the main means of communication, books, such as there were, and they were mainly religious, had to be turned out by copyists, who illuminated gorgeously the parchment and vellum on which they worked, but whose output was too limited and too costly to be available to many persons. The invention of the hand printing press with its flat bed was an epochal moment in the life of man. Yet there have been men by the hundred who have denounced it. They have charged that it cheapened literary composition by lowering the level of intelligence to which it must appeal (as though

Shakespeare had not appealed to all classes and all orders of mind for centuries), that it made possible the production of books not worth producing, that it put indigestible facts within the reach of multitudes, and that it brought in its train others of the worst evils charged to the machine.

We know but few, if any, unmixed blessings; yet the flatbed press operated by hand certainly opened opportunities for a hearing to thousands whose voices otherwise might have remained forever silent. Among those thousands, we may be certain, were some of unquestioned value, even of genius. But the flatbed printing press, once steam was applied to its operation, revealed a defect wholly incompatible with the ideals of a mechanized world. One half the power applied went to waste, because, after giving an imprint to paper, the bed must spend half its time moving back to start over again. Therefore the rotary press, continuously at work, was invented; and instead of leaving the type in its iron frame, as Pi Sheng had done, an impression was made of it on mats and reconveyed to a semi-cylindrical form. There came into being a new division of labor; the stereotyper made his appearance.

V

The pamphleteer has all but disappeared from modern life. There is little room for him, unless he has the wealth of Mr. Otto H. Kahn, in a world where books and magazines can be printed by the million. In Tennessee there is a plant which, utilizing Ford methods of production, turns out hundreds of thousands of dictionaries, Bibles, textbooks and fiction "classics," the last-named for chain store distribution at ten cents a copy. These ten-cent volumes are not paper-back booklets; they are bought in cloth, like any two-dollar novel, printed on good book paper, and plates are cast for them. The employment of cheap mountain-district labor, with nearly all the raw materials close at hand, and the utilization of mass-production methods, enable this huge printing plant to effect such economies that it has set a new pace. Older and more conservative publishers, of course, do not resort to these practices.

Few readers of magazines realize how intricate and accurate is the machinery which enables them to buy for a few cents publications clearly and beautifully printed, sometimes in colors. There are printing presses now which lay down on one side of a sheet of paper four colors and simultaneously two colors on the other side. These impressions must be so accurate that there is no overlapping to offend the eye. The difference of a hairline means a blur or a blob. And these machines move so rapidly that thousands of magazines are delivered hourly, either in color or in black and white. Some of them contain hundreds of tons of metal; each one of them is a fresh reminder of that ingenuity which has remade the modern world.

Paper-making and the art of printing are at the foundation of Twentieth Century communication, and have the dignified authority of age, but they are neither the swiftest nor the most remarkable of our achievements in conveying to one another our thoughts and the tidings of the day. Printing has this advantage over the telephone and the wireless, that the record it makes is durable, or will be so if good paper is used, whereas the spoken and the telegraphed word, whether by copper strands or through the air, is fugitive. The press has no need to look to its laurels; it is and it must remain sovereign in its domain. But in sensationalism it pales beside its youthful competitors.

Although the telephone is but a little more than fifty years old, its use in the United States is growing nearly four times as fast as the population is increasing. In five years the wire mileage was lengthened by nearly three-fourths, and in 1927 considerably more than thirty-one billion calls were made. The receiving and transmitting apparatus to-day consists of two hundred parts; but when the first switchboard was built in New Haven, Conn., back in 1878, the transmitter consisted of a single piece, not very unlike the "French 'phones" now popular, and subscribers were warned not to listen with their mouths and talk with their ears. A "switchman" was in charge, and his salutation, when called, was "Ahoy!" The subscriber called the person he wanted by name, not by number. That system was still in vogue two years later, when New York City had the extraordinary equipment of fifteen hundred 'phones. Since then the American Telephone and Telegraph Company has established the biggest and costliest research laboratories in the world, and is restlessly on the alert for improvements. Let me quote from its current literature:

> During the afternoon of March 17, 1928, an alarm bell rang in a telephone test station in the heart of the Alleghany Mountains. This meant that a puncture had been made in the air-tight sheath of a busy inter-city cable. The men on duty knew that the injury was somewhere within fifty miles.
>
> Highly developed locating devices were instantly applied and in sixty-five minutes the trouble spot was located. By 7:15 in the evening, before the break in the sheath had affected service on any of the 248 pairs of wires in the cable, the repairs had been made . . . not one conversation was interrupted. This special alarm system is one of the many mechanical and electrical wonders developed by Bell System engineers to guard telephone conversation. The apparatus is placed along the cable routes at intervals of 100 miles. . . . There is no standing still in the Bell System. Constant progress in accuracy and better and better service at the lowest cost is its goal.

Railroads are now installing inter-car telephone systems on their crack passenger trains, so that indolent passengers may summon fellow travelers, porters and waiters from the diners, club and observation cars. The telephone, in some instances, has become a sort of indispensable nuisance. It came as a surprise to me, and as something of a shock, too, when I learned that it was not altogether indispensable. On setting up a Summer workshop in New York City, partly in order to get away from the 'phone at my country home, I defied the conventions and well-meaning advisers by freeing myself to that extent from one of the tentacles of an octopus Machine Age. Those who wished to communicate with me about matters of sufficient importance could use a messenger or the telegraph; those who wished to pass the time of day or invite me to play poker could remain silent; at least I was insulated from them. Nor was it much bother, when I myself wished to pass the time of day, to seek out a near-by telephone booth. It is difficult to imagine any considerable city as functioning without the 'phone nowadays; even the farmer needs it; but it is not impossible to conceive of diminishing individual inconvenience from it.

VI

In colonial days, when the sailing vessel was the chief means of transportation and communication along the eastern coast, it required two days, with favoring winds, to go in person or to send word from New York City to Philadelphia. Now we make the trip by train in two hours, but we deliver the message in the fraction of a second. New York, for purposes of communication, is within one-fiftieth of a second of London and Paris, thanks to that elfin one-way system known as wireless. We telephone from ships to friends or business associates or kinsfolk. Wireless telephonic communication from ships to stations ashore began in 1916, over a space of two miles, and succeeded even where jutting land intervened, thus confounding the skeptics. To-day we span three thousand miles in that way. By means of telephony the wireless quits its restricted field and becomes for the nonce a two-way system.

Now, although the internal combustion engine has given man a mobility more marvelous than could be conferred by the magic carpet of the Arabian Nights' Entertainment, nowhere has his conquest of space and time with machinery as an accessory been illustrated more spectacularly than through wireless. Yet this is in lineal descent from an uncanny advantage conferred by one of nature's forces, electricity.

With a kite and silken cord, Benjamin Franklin upset the theory that this enigmatic force could be generated only by friction. Not until more than half a century later did Michael Faraday, with seven half-pence, seven disks of zinc and six pieces of paper moistened in salt water, find that he had brought into being a force which could decompose sulphate of magnesia. Then he learned that he could rotate magnets wound in wires, and the modern motor hove above the horizon. In August, 1831, Faraday discovered that he could generate one electric current from another in a different circuit. "I am busy just now," he wrote to a friend, "on electro-magnetism, and I think I have got hold of a good thing, but can't say. It may be a weed instead of a fish that, after all my labor, I may at last pull up." Such are the misgivings of those who venture into the vanguard of human knowledge. Subsequently a skeptical and utilitarian Britisher asked the scientist what use could be made of his experiments. "You can tax them," Faraday retorted with bitter irony. In 1928 a single electrical concern paid to the United States Government more than eight millions of dollars as its income tax. Faraday, defending his work against a thick-witted official, spoke more truly than he knew.

Between Faraday's rotating magnets and conversations from mid-ocean to shore functioned scores of inquiring minds. Morse in the United States, Cooke and Wheatstone in England, took out patents for the "magnetic" electric telegraph. This was in 1837, but it was not until five years later that Morse clicked messages over copper wires between Washington and Baltimore. Before he died a trans-Atlantic cable was under way. In England Wheatstone was experimenting with what he called a "magic lyre," and in Massachusetts Dr. C. G. Page noted a musical note when the armature of an electro-magnet revolved in front of the poles. Bell, Branley, Trowbridge and others of that adventurous group took the hint. The telephone was in the offing.

VII

By means of the telephone and telegraph we communicate with distant places, obviously, much more quickly than we could travel thither, even at six miles a minute. It was half a century after Faraday began tinkering with his zinc and copper discs, however, before the swiftest form of communication was suspected. Then Heyworth found a way to send electric signals without the use of wires, or any other continuous artificial carrier. Five years later, in 1867, an English scientist told the Royal Society that aërial electric waves could be used for telegraphy. Bell, Dolbear and Edison in the United States, Hertz in Germany, and the Italian son of an Irish mother—Marconi—probed the problem. Marconi applied in London for patents, and in March, 1897, he managed to send wireless messages four miles. Within the year he had built two sending and receiving stations. Meanwhile De Forest was taking out patents in the United States, commercial stations were being constructed, and a few ships were being equipped. But it was not until the *Republic* of the White Star Line collided with an Italian steamship off Nantucket, January 23, 1909, when fifteen hundred lives were saved with the help of a wireless "C Q D," that the public awoke to the dramatic and almost miraculous possibilities of what, until then, had been regarded generally as merely another toy.

Then an ice floe, in 1912, sank the *Titanic*, and seven hundred lives were saved because a distress signal was sent out by wireless. (The signal then had become "S O S.") After that ships were required to equip with the new device, in most instances, and the shares of wireless concerns began to mount in the world markets.

As the World War progressed the new instrument of communication was still further advanced, and Howard Armstrong, a youthful student of electro-mechanics at Columbia University, patented a regenerative circuit known as the self-heterodyne. It was not long until men were talking across oceans; aircraft and armies were equipped with wireless telephonic and telegraphic devices.

But it was not until 1920 that some twenty-five persons heard by wireless the results of a national election. Eight years later nine million receiving sets tuned in on election night, and it was estimated that fifty million persons heard that Herbert Hoover had been elected. There were then about six hundred wireless sending stations in the United States and about five hundred in all Europe. The production of receiving sets went into mass methods. Nearly two-thirds of the twenty million sets in use throughout the world were of American manufacture. Here, as in the automobile field, we led all competitors. The industry's turnover in this country that year was just short of two-thirds of a billion dollars, as against half a billion the year before.

But wireless is to have no monopoly of trans-oceanic telephony. Plans are being laid for a cable to carry the human voice, not the Morse code. Transoceanic telegraphy became possible when the first cable was laid near the middle of the Nineteenth Century, but the efficiency of the cable has been improved fivefold since the *World's Work* began publication. This was made possible through a new compound of nickel and iron, known as permalloy. Until it was discovered a few years ago by patient electrical engineers, metallurgists, physicists and mechanical engineers, working as an inquiring group in the research laboratories of the American Telephone and Telegraph Company, Norway iron was the most magnetic ore known to the scientist. Permalloy has a magnetic permeability one hundred times as great; and by "loading" cables with it, as land lines are reinforced at intervals by magnetic electric coils, it became possible to transmit messages five times as fast through cables as before. Permalloy is so sensitive that the feeble magnetic field about the earth saturates it. A bar of it lying north and south is of a different dimension from the same bar lying east and west. Such are the efforts by which modern communication is improved, and man's Mercury takes on faster wings.

CHAPTER EIGHT

COMMUNICATION (*continued*): From Stickful to Stereotype

I

No American institution has shown the impact of the Machine Age more unmistakably than the daily press. Not only has the mechanization of this, our principal means of communication, brought the usual phenomena of standardization and mass production; it is reflected also in consolidations, in the organization of huge chains, in distributory processes, in news content and in editorial attitudes. There are now nearly one thousand towns and cities in the United States which have but one daily. As a rule, here and elsewhere, the editor is no longer the owner, but a hireling. The daily journal is published for revenue only, on precisely the principles which apply to the manufacture of soap, shoes and automobiles. Thus it has become primarily an agency of entertainment, superficial emotion and commercial exploitation of its readers, rather than primarily a channel of information and opinion. To these statements there are a few exceptions of small circulation; to the generality of our metropolitan press they apply literally.

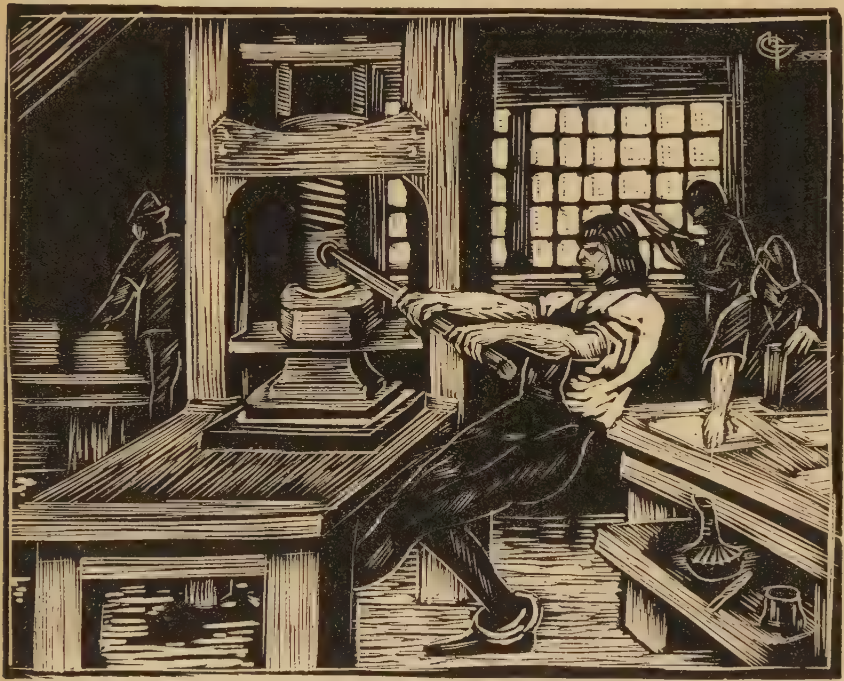
A penetrating comparison was made in 1929 of three hundred city papers published in England and the United States. Four mid-week editions of each, to avoid the thin Monday and fat Friday issues, were studied, measured and classified. First it was found that the American papers gave more than twice as much space to strictly local events—17.2 per cent. as against 8 per cent., to be exact. Americans appear to be the more provincial, the more interested in neighborhood gossip, or newspaper editors believe them to be so. To sports the newspapers in this country gave 16 per cent. of their space, as against 14 per cent. in the English journals; to financial news 14 per cent. as against 18 per cent. My own inquiries in *Ballyhoo* show that the space devoted to sports multiplied fifteenfold in the half century preceding 1926, while the space devoted to business fell off slightly. These tabulations reveal also that the space given to opinion has fallen off relatively by three-fourths, and that devoted to crime has more than doubled.

Now as to "features": The recent survey brought out that the American newspapers gave one-fifth of their "reading matter" space to comic strips (in this department, twelve times as much as the English), women's pages, fiction, beauty hints, advice to the lovelorn and similar "tripe." The English newspapers gave only 6.8 per cent. to all these, or less than one-third as much. And the English journals gave 11 per cent. to foreign news, while the American gave but 3 per cent. The survey was made in London, and it was observed that "England still prefers first-person articles, which are practically extinct in America, and impressions and all expressions of individuality; while the American press tends increasingly to standardize and impersonalize."

It should be conceded that the British Empire, more closely enmeshed geographically and more concerned in policy with foreign relations than the United States, might well be expected to take a greater interest in foreign news, particularly of a political nature. But, although the industrial revolution is credited to England, with the patenting of the steam engine, the factory system and mass production have reached no such heights there as here. Nor is the English press so expertly mechanized as the American press. Nor is it so obviously the pliant tool of commerce and industry. A comparison of the *Manchester Guardian*, best of English newspapers, with any of the better newspapers here, will amply demonstrate these facts, even to the casual newspaper reader.

II

It is true that our newspapers began as a machine-made product. That is, they were printed on a mechanical press, although the driving power was human muscle, not steam. The first printing press was imported into the colonies in 1639, about two centuries after England learned the art of transferring to paper impressions from movable type; the second was brought over in 1660. Two years later the Government of Massachusetts appointed an official licensor of the press, an attitude which finds expression now in the censorship of books; and then, in 1664, printing was forbidden anywhere in that colony save in Cambridge, under license. These presses, however, were used at first merely for printing pamphlets. The first newspaper did not make its appearance until seventy years after the Pilgrims landed. Its first issue was published on September 25, 1690, and was called *Publick Occurrences.* Its purposes as announced were to print "such considerable things as have arrived unto our notice," and "that something may be done toward curing, or at least charming,



of that spirit of lying which prevails among us; wherefore, nothing shall be entered but what we have reason to believe is true."

The life of this paper was just four days. The publication of the truth about the barbarities of Governor Winthrop's Indian allies, in an expedition against the Canadian French, caused its suppression. Its publisher, owner, and editor was Benjamin Harris, who had been noteworthy in the fight for a free press in England. He made the error of going to Boston, and there need be no surprise that he was soon banished from the stamping ground of the timorous and illiberal Lowells. Later editors, being less independent, lasted longer. Yet all of them, until half a century after the Constitution was adopted, were in descent from the elder pamphleteers.

The early presses took the impression of type by means of a ponderous screw, turned slowly down by hand, and could not print more than fifty sheets in an hour. Benjamin Franklin, when in the Patent Office in Washington, used a modified form of the early machine which could turn out two hundred and fifty impressions an hour. The Washington press, invented in 1829, was the last to employ hand-power, although there were later inventions using foot-power by a treadle. One of these was designed by Daniel Treadwell, whose name would delight a newspaper columnist.

The first cylinder press was used by the London *Times* in 1827; the first in the United States was installed for the Philadelphia *Public Ledger* in 1846. The English machine was much the faster, with more than four thousand impressions in an hour, on one side of the sheet. In 1860 William Bullock of Pittsburgh began feeding a cylinder press from a roll carrying five miles of paper, and cutting the sheets with a serrated knife. Eleven thousand finished pages were delivered to the receiving board in an hour; but Bullock proved literally to be a Frankenstein; he was crushed to death in his own machinery.

The web press, printing simultaneously on both sides of the paper, was an English invention in 1835, but was not successfully followed here until, forty years later, the Cleveland *Leader* installed one constructed in Brooklyn, which not only printed twelve thousand sheets an hour, but inserted, pasted, folded and cut them in one continuous operation. After this the progress to sixty-ton machines, of quadruple and sextuple units, was rapid; and it was not long before they could deliver one hundred and forty-four thousand four-page papers in an hour, printed, cut, and folded in readiness for delivery.

III

Meanwhile expensive rag paper had been supplanted, for newspaper purposes, by cheap and quickly perishable paper made from wood pulp. The first paper mill west of the Alleghanies was built in 1793 at Royal Spring, a Kentucky hamlet, the second in 1796. By the end of 1883, when the frontier of this country was about to be pushed into the Pacific Ocean, there were eleven hundred paper mills, some of them manufacturing a high grade of paper for other than newspaper uses. We now import newsprint annually at a cost of more than one hundred million dollars, in addition to our own manufactures.

In the thirties of the Nineteenth Century the telegraph was invented and successfully tested, but it had been in use two years before any newspaper availed itself of the speedier means of transmission. The transatlantic cable was eight years old before the press made use of it. These delays, we may be sure, were due to the expense involved. When a method was devised of etching zinc with acids in 1837, and thus transferring photographs to the printed page, its cost was so slight that the New York *Graphic* at once took it up, and on December 2 of that year became the first newspaper in the world to employ such illustrations. It was a forerunner of the Twentieth Century tabloid picture papers.

Merganthaler Number One, the first machine to set type automatically on a commercial basis, was assembled in the composing-room of the New York *Tribune* July 3, 1886. Already the typewriter and telephone had been invented. The daily press was now prepared to meet the demands of an enormously expanded industrial world for a swift road to huge, suggestible markets. The newspapers themselves were being manufactured automatically and at lightning speed, out of cheap and ephemeral raw material; and they needed only to stick faithfully to the aphorisms of James Gordon Bennett and William Randolph Hearst, which subordinated news to thrills and entertainment, to serve faithfully, so their editors felt, as the obedient slaves of Big Business.

IV

Newspaper publishing, indeed, itself became Big Business.

With an annual turnover well above a billion dollars, three-fourths of which was derived from advertising, the daily press of the United States turned, in the second quarter of the Twentieth Century, to a frank imitation of what we call "Ford methods" of mass manufacture. In its composing rooms it began adopting the "stream-line" plan of production. Batteries of typesetting machines were set in compact rows, the machines for setting advertisements and headlines were so placed that there was a minimum of lost or waste motion, metal supply stations were conveniently located, the proof presses, the proofreaders' desks, the makeup tables, the "ad" alleys, the type-casting and material-making machines, the stereotype unit, the molding machines, the roasters, the metal pumps, the presses and the delivery boards, were so arranged that the whole product, from the typewritten copy to the printed, folded and counted newspapers, rolled in a straight line, as smoothly and directly as an automobile along one of Henry Ford's moving belts. Even one hundred thousand pounds of ink —or more—was fed automatically and evenly into the presses.

Nor did newspaper publishers shrink any longer from the cost of cable transmission. The Owen D. Young plan, to correct the blunders of the Charles Gates Dawes plan of reparations payments, was transmitted in full from Paris to the newspapers of the United States, although it ran to 28,976 words, and required nine hours of time. It covered about three and one-half pages of the average newspaper. The Machine Age has so bloated the advertising accounts of the newspapers that they can spend huge sums without compunction. One of them has spent a million and one-half dollars in a single year on stuff about stunt aviation alone. The daily press is stronger financially than ever before; outside its sporting and financial pages it is no longer venal, as it was during the latter part of the Nineteenth Century. That many sporting writers and many financial writers accept dishonorable gratuities for the ballyhoo of dubious ventures is an open secret of the craft; that many publishers or editors accept that sort of thing no informed person supposes, although unquestionably they know—or must suspect—what is going on among some of their underlings.

It must be said for the newspaper of the Machine Age, too, that with a single exception it avoids immoral and unsocial advertising. The exception is the patent medicine, which has returned in full flower to its columns. Temporarily banished from the public prints a quarter of a century ago by a strong public revulsion, the quack and the charlatan now pontificate as arrogantly and ruthlessly as ever before. This first came to my attention from an inspection of the Buffalo, New York, *Evening News*, which had twenty-four such advertisements, an average showing.

Individual advertisers, except in rare instances, can no longer suppress unfavorable or distasteful news, nor dictate its treatment. And modern machinery has put at the disposal of the press facilities of communication which give it an uncanny contact with far places. Events on the other side of the earth actually can be published before, by the clock, they have happened; the wireless wave and the cable vastly outrun the clock-setting sun.

The machine is likely to act upon journalism, indeed, somewhat as the cream separator acts upon a modern dairy farm. The best will be thrown to the top, and the bluish thin residue will take its proper place, as a sort of newspaper dregs. The radio, a pixy child of the machine, will assist in this process. We will have worse newspapers in the future, but we will also have others far better than any we read now. It seems to me that there will hardly be a middle class. An educated public will demand and get what it wants.

V

At present the newspaper-reading public, including the educated as well as the majority, which is literate but uneducated, is bombarded daily by a stream of propaganda, chiefly on behalf of mechanized industry. In the next chapter I shall wish to discuss the effect of this practice on the dependability of the press itself; at the moment it may not be amiss to tell in detail of the viewpoint and methods common among press agents and "counsels in public relations." For my purpose I will select a pioneer in that field, now its most conspicuous incumbent. There are many members of his guild, and their activities, as exemplified by Ivy Ledbetter Lee, are of obvious consequence to the electorate of this republic.

One of Mr. Lee's early jobs was to represent the Rockefellers during the bloody warfare that resulted from the strike against the Colorado Fuel and Iron Company. The publicity he put out was subjected to Congressional inquiry, and some unfavorable facts were elicited as to the ethical standards which animated him. These are a matter of public record, and have often been used against Mr. Lee. I do not see any occasion for repeating the stuff here. In the first place, I am persuaded that Mr. Lee has since arrived at a somewhat higher conception of his work; in the second place, I realize that it is human nature to justify personal errors. One of my father's earlier converts to the Baptist faith, I have been told, was a rich and elderly bachelor who had often been criticized for his ways of living and acquiring wealth, and who on a sick bed decided he had better make peace with his Creator. It was before the day of bath-tubs, but the servants rigged up an oilcloth contraption and my father dipped the old gentleman. After he had been dried off and put back into bed, the young clergyman sat beside him and said gravely: "I do not doubt, Brother van Meter, that if this spiritual change had come earlier in your life, you would have done a great many things differently." "Well," said Mr. van Meter, "taking it by and large, Brother Bent, I think I've done pretty goddam well." I venture to guess that Mr. Lee thinks he did pretty well by the Rockefellers in Colorado.

Certainly the elder Mr. Rockefeller can hardly say that Mr. Lee hasn't done well by him. Before he "retained" his own propagandist, he had suffered a deal from propagandists in the enemy camp, notably Miss Ida M. Tarbell. He was ill-esteemed by the American public. Now began his rehabilitation. Malicious newspaper paragraphers who noted that with nearly every benefaction came an increase in the price of oil or gasoline or both, calculated to bring a surplus revenue comparable with the gift, were publicly and severely rebuked. Gradually the mass attitude shifted. The splendid press Mr. Rockefeller got on his ninetieth birthday registers a main source of that change. Thus, on Sunday, July 7, Mr. Lee's former employer, the *New York Times*, spoke in an extended news story of Mr. Rockefeller as "America's 'grand old man' of finance," and in a two-page magazine article presented "an intimate picture of the man who accumulated the greatest fortune in the world and then, after divesting himself of much of his wealth, began to cultivate the fine art of living." This occupied the first two pages of the magazine section. Even those who are skeptical of any publicity man's achievements may recognize Mr. Lee's skillful hand in this.

It happened that capitalists had been looking for oil concessions in Russia, and it happened that Mr. Lee announced, as his "personal" opinion, that this country should recognize that government. It was a temerarious thing for an apologist of capitalism to do, and aroused a deal of newspaper and periodical comment. Diplomatically, it was even more indiscreet. Once upon a time I obtained from the State Department in Washington, with the understanding that I would submit the manuscript for visa as to accuracy, material for an article on trade with the Soviets. The only charge of inaccuracy was against my speaking of the Soviet government. It was explained to me that, since the United States had never recognized any such thing as a Soviet government, there couldn't be any such thing, at least so far as this country was concerned. The metaphysics of diplomacy is sometimes a bit confusing. In any case, my article was never printed. Mr. Lee labored under no such limitations. After his first pronouncement, he visited Russia for ten days, and wrote a book about it.

Ralph M. Easley of the National Civic Federation, himself a propagandist of parts, took Mr. Lee to task about that book. In an open letter to the press, he said that if Mr. Lee had kept all the engagements and attended all the functions, social and otherwise, mentioned in the book, "you must have abandoned for that ten-day period all ideas of eating and sleeping and spent the entire two hundred and forty hours in one continuous round of 'riotous' conferring. . . . What you doubtless did was to start the Skvirsky bureau in Washington at work on your report as soon as you made up your mind to go to Russia, so that upon your return Colonel Skvirsky would have it ready for you to add a few touches of local color."

This charge Mr. Lee repudiated, but Mr. Easley was moved, nevertheless, to certain indignant reflections.

"Much is permitted," he said, "to a professional publicity man, especially when he affects also the rôle of statesman, because of the recognized commercial motives which must dominate his every act and every word, however beautiful the rhetoric with which he may envelop the latter. But there are limits."

VI

In this, I must disagree with Mr. Easley and the National Civic Federation. I cannot concede that there are limitations on Ivy Lee and Associates. There was the case, for example, of their efforts on behalf of the Interborough Rapid Transit, owner of subway and elevated lines under a special joint contract with New York City. The State Transit Commission summoned Mr. Lee to find out about these efforts, and learned that in less than eight years he had collected $212,954.19 for fees and expenses. The expenses were in part for the printing of the *Subway Sun* and *Elevated Express*, broadsides posted in the cars. All the payments to Mr. Lee were charged to "operating expenses," and thus, under the transit contract, were paid by the city. The voters of New York and city officials had, by referendum and public utterance, rejected an increased fare, but the *Subway Sun* and the *Elevated Express*, published with city money, had advocated increasing the rate. When this point was brought out, Mr. Lee protested that it would be in the interest of the city and of car riders to increase the fare.

"Do you think," he was asked, "that it was proper for you to assume that you knew what was in the interest of the city, when the duly elected city authorities were opposed to it?"

"Yes, sir," Mr. Lee retorted. "It is conceivable that their favoritism for a five-cent fare was to get votes."

Favoring a five-cent fare merely to get votes is obviously quite different from favoring a higher fare in order to collect fees and expenses.

When Mr. Lee was asked to explain the difference between his work and that of a publicity agent, he said frankly that he didn't know, but he did clarify somewhat the dimensions of his function as an adviser in public relations:

> Practically every large corporation [he said] has, of course, very important relations with the public. It is important to study the operation of public opinion, and to study the attitude of the public. It is very important that the corporation of interest should make known its activities so they will be understood, and my work is to assist, so far as I can, in enabling corporations to do this.
>
> You mean [he was asked] in placing their affairs before the public through publicity methods in the most favorable light?
>
> That, and also shaping their affairs so that when placed before the public they will be approved.

On another occasion he said: "In the person of the modern publicity man we have some one who is marshaling the evidence for his side"—a special pleader before the court of public opinion, as Edward L. Bernays, another propagandist, expresses it—"and the newspaper must adjust itself to that."

The newspaper, needless to say, has adjusted itself. Many of the stories and items we read in the daily press emanate from agencies with an ax to grind (and are printed as a rule, not on the authority of that agency but on the journal's authority). Mr. Lee has somewhat facilitated this adjustment by the publication of an occasional clipsheet called Information. He is not the inventor of the clipsheet. That instrument for slicing out chunks of free space was conceived by propagandists for Prohibition in this land of the free, and is now an invaluable weapon in the armory of nearly all press agents.

VII

We thus have a troupe of trained publicists, working on mass emotion and opinion chiefly on behalf of corporate and capitalist interests. Yet the very nature of our governmental processes facilitates the work of the propagandist. In ancient Greece and Rome, temple oracles swayed the public temper. There was no printing press, no radio and no newsreel. In the modern United States, issues are made by minorities, and minorities cannot make themselves heard without the assistance of national propaganda. Often the issues they champion are so specialized and intricate that the electorate cannot cope with them unless put through a kindergarten training, and perhaps is incompetent even then. How many persons in New York City are fitted to pass intelligently on the question of the five-cent fare? In the circumstances, Mr. Lee's pithy, statistical statement of the increase in costs of operation and equipment since the five-cent fare was instituted, as broadcast through the *Subway Sun* and the *Elevated Express*, puts a ready-made argument into the hands of the voter. It does not put into the voter's hands, strangely, statistics of the increase in passenger revenue, nor of economics affected through the introduction of such devices as turnstiles to supplant salaried ticket-choppers.

The manufacture of public opinion in this country is largely in the hands of paid propagandists, working chiefly through the daily press. The real raw material of the newspaper is the human mind. We are a suggestible people, lacking the stabilizer of any real devotion to tradition, and the newspapers spray upon us constantly a stream of publicity and propaganda. My confident belief is that the daily press is rather to blame for the situation than the publicists and propagandists.

VIII

Let us look back, briefly, and see how American newspapers got this way. Until the middle thirties of the last century, as we have seen, the newspaper owner was usually editor, and he was a leigitimate heir of the famous English pamphleteers. To start a newspaper and continue it did not cost a great deal of money in those days. News, when it had any political implication, was printed solely for its political effect; this was the only pattern generally recognized. In 1832 immigration into this country tripled, railroads were being built, agricultural machinery was being improved, coal was being mined, and in the afternoons the main streets of our cities revealed an extraordinary, an almost medieval, contrast between the luxury of the very rich and the sufferings of the very poor. Newspapers were sold by subscription only, and cost six cents a copy. An industrial population was growing which demanded cheaper access to tidings about the democratic experiment which was being tried in the western world, and about its environment, seen and unseen.

Ben Day founded, in 1833, the New York *Sun*, first of the penny papers to live, and in 1834 the elder James Gordon Bennett—unquestionably the most sinister figure in American newspaper life—founded the *Herald*, now combined with the *Tribune*, although Horace Greeley, founder of the *Tribune*, refused to join Bennett in his enterprise. Other penny papers sprang up in Boston, Baltimore, Philadelphia. They were the grandfathers of the modern picture tabloids. Bennett's announced theory was that the newspaper was not meant to instruct but to startle, and he exhausted his ingenuity in devising new thrills for his readers. For the first time reporters began raking through the muck of police and divorce courts; for the first time the press became the touts of the race-track and the prize-ring; for the first time the old folk stories, Bluebeard, Cinderella, prince-and-peasant, Jack and the Beanstalk, assumed a capital value under the guise of news. Bennett printed the advertisements of prostitutes with a conscience as easy as when he printed scandal and crime. He was fined in a Federal Court for the advertisements, and subsequently fled the country, but his competitors made no mention of either fact, for the *Herald* had a huge circulation, and already they were aping Bennett's methods. They abused and derided him, but they imitated him and suppressed news about his offenses because they thought this a sort of *noblesse oblige.* Their behavior was due to clan loyalty. In the same way, although they have abused and derided William Randolph Hearst in this Twentieth Century, they have taken over bodily his practice of making his papers amusing and entertaining, for they have seen that this sells papers. (Hearst boasts that he reaches forty million Americans.) None of them tried to make their papers entertaining or stimulating intellectually; the patterns stamped out by Bennett and Hearst dominated, and they were patterns which appealed solely to primitive emotions and hungers.

E. L. Godkin, when he was editor of the New York *Evening Post*, never attained a circulation of more than twenty-five thousand. He did not care for circulation so much as for influence. He retired in 1899. What has happened to cause the marked turnover, now manifest, in the editorial attitude? It can be explained only in terms of the machine. In the last decade of the Nineteenth Century newspapers derived from the sales of copies about half their revenue; in the second quarter of the Twentieth Century they derived three-fourths of their revenue from advertising, and they got the advertising in growing volume as the practices of mass production made imperative larger and more readily exploited markets. If such markets were to be created and maintained through newspaper advertising, the newspapers must have immense circulations, and their publishers knew that the patterns stamped out by the discredited Bennetts and Hearsts made immense circulations. The American advertiser is responsible in the main for the sorry showing our press makes in comparison with the English press; the newspaper owner and publisher are merely accessories before the fact, in their incorrigible itch for the almighty dollar.

IX

Dr. Nicholas Murray Butler of Columbia University complains that the center of gravity of American interest has shifted from civil liberties to wealth. Of newspaper owners and editors this is demonstrably true. They have observed, for instance, that exposures of official corruption or cruelty or negligence, even when sensational, do not make for big circulations, which to them mean the wealth of fatter advertising revenues; therefore they ignored the Teapot Dome scandal for months, although they knew about it, until a Senate Committee forced the facts into public notice; therefore they took no step to clear the names of Sacco and Vanzetti, although they heard, before the men were executed, that two gangs with which neither of them had any connection had committed the Bridgewater and South Braintree crimes; therefore they turn over their columns, or a disproportionate share of them, to stunt aviation, night club hostesses, murders, triangular love affairs, and public executions, without regard to their social function or the social obligations implicit in the first amendment to the Constitution.

The newspaper editor's plea, when confronted with these undeniable facts, is that he is giving the public what it wants. He holds that the modern monotony of automatism should be relieved, and that the press should afford to its public an alley of escape. To do this is impossible, he will say, unless one gives reams of space to stories of mystery, suspense, violence and illicit love. These, he insists, are what really interests the public. He does not pretend, of course, that they are in the public interest. Nor does he pretend that comics, flapper fiction, fashion hints of doubtful authority, advice to neurasthenics and lovers, beauty formulæ or "red magic" are in the public interest. He does think they interest the public. He goes in for the ballyhoo of sex for precisely the same reasons as our Ziegfelds and some of our patent medicine advertisers, that is to say, for shekels. He has a commodity to sell, just as they have, and apparently he does not regard it as subject to any higher standards. He plays the game under the terms of the bitterest competition. He scratches the backs of the Ziegfelds and the charlatans, and they scratch his. He scratches the back of the "power trust," by printing its propaganda, just as some of our public schools and colleges and universities do, and here he appears to be in better company; and the power interests scratch his back with entertainments and advertisements. All are cogs in the modern machine.

Such is the established but not necessarily changeless journalistic posture toward news. What of the editorial attitude? One executive of a successful journal has said that editorial writers were using wooden words to express wooden thoughts. They were; most of them are. It is true that the *World* has a fresh and forceful page, and that the Baltimore *Sun* steps out on occasion with a certain freedom; the St. Louis *Post-Dispatch* is more courageous and outspoken than either of them; but these are exceptions to the general run of metropolitan papers. The urge for big circulations limits their liberty in the severest way. Lest they offend a few or a class or a religious segment of their readers, they think it best to tread softly and not even to carry a big stick. Their opinions, like their news, are carefully calculated with a view to the greatest common denominator of their public. Their implicit policy is that God's in His Heaven and all's well with the world.

Perhaps it is not to be regretted that the penny press and the simultaneous flowering of mechanized industrialism struck a vital blow at the old editorial partisanship. The editors of the penny papers taught their more dignified contemporaries at least this lesson: that the primary task of a daily publication was to its whole public, not to the fraction espousing one political faith. There are still journals which have not learned the lesson, notably the Chicago *Tribune*, a dozen big papers south of the Mason and Dixon line, the *World* and *Herald Tribune* in New York City. All of these are "yellow dog" partisans, yet none of them fails to print news about the activities of political rivals, even though they may subordinate it to news of their own party. Half a century ago this was not true of most dailies. The editor or owner, who may or may not have been subsidized politically, conceived it to be his duty in those days to ignore the opposition.

Doubtless it is better for readers to get both sides of current questions. Yet there has gone hand in hand with this change in attitude a dulling of the editorial and proprietary conscience in politics. The three newspapers in Springfield, Massachusetts, for example, represent the Republican, Democratic and "Independent" attitudes; all are owned by the Bowles family, and the editors expressing these divergent views draw their pay from one treasury. Frank G. Gannett, who owns a string of twenty-four papers, appears to find no difficulty in owning both Democratic and Republican organs in one city. In cities where there is but one daily there can be no real expression, obviously, of community opinion.

X

The Big Business practices which have grown up during the Machine Age, of consolidations and central managements, have been imitated by the daily press at a great but as yet unaudited cost to freedom of expression. The economies of syndicate production have put at the command of dailies "features" which some magazines cannot afford, and to that extent have proved beneficial; but they have brought also a standardization which makes the Los Angeles daily much like that in Omaha or Duluth or Philadelphia or Richmond. Only in their local news do they vary much. Their continental and foreign news they get from agencies which serve all alike and forbid that their material be altered. The papers share alike in the doings of the Gumps, the pontifications of Glenn Frank and the inanities of Bruce Barton. Dorothy Dix advises millions of the lovelorn in one day, in precisely the same words. If one paper falls down on reporting Colonel Charles A. Lindbergh's marriage, all of them fail; and my own observation indicates that the entire country rejoiced that the Colonel was able for once to maintain his personal privacy inviolate. The total effect of the whole daily press of the United States is an effect of sameness; and it is an effect which is losing its potency, just as a bell constantly ringing a single note ceases in time to be heard.

The surrender of the newspaper to the conditions and the demands of the Machine Age has reacted in a general distrust and dissatisfaction on the part of the American people. In extended speaking trips I have been somewhat surprised at the intensity and prevalence of this feeling. It is certain to have its effect in time on the owner and editor, for they depend finally on the public for their living. Once they lose their public they lose their advertisers. That is why the prospect for American journalism does not seem to me so dark as this picture may make it seem. The competition of the radio, in the news, entertainment and advertising fields, must have a sobering and stabilizing influence. If Big Business has adopted service as its slogan, how can the daily press fail in time to come to a renewal of its ideal of public service? The repudiation of its functions as a censor of government and a channel of honest information about current events cannot continue long if it is to escape drastic regulation or dissolution. Not even its enemies wish to see either thing happen. Nor is its ownership so stupid as to fail to read the handwriting on the wall.

Already the press has been weighed and found wanting. The manufacture of paper from corn stalks (invented abroad), the adoption of devices to operate typesetting machines from a distance by electrity, the installation of streamline production, nor any other of the marvels of modern industrial progress, will be counted as real progress by the American public. The only advance which will be generally applauded will be an appeal from the fourteen-year-old mind to a higher level of intelligence in its readers. This will come when sex, crime, and thrills are actually subordinated to the solidly informational tidings of a complex and amazingly interesting world. That they will turn their attention ultimately to engaging and worth-while news it is impossible to doubt.

CHAPTER NINE

COMMUNICATION (*concluded*): From Facts to Fakes

I

If newspapers are hospitable to propaganda, to what extent does this taint their columns? Their affirmed purpose is to get the truth, the whole truth—so far as they have space for it—and nothing but the truth. As we saw in the last chapter the Machine Age is responsible for a type of propaganda much more insidious than its original form, which was religious. Senatorial inquisitors, for example, as an aftermath of belated revelations about the 1927 Geneva naval conference, brought out many disquieting facts about this form of activity. Commenting on their findings, Dr. William T. Ellis, who has corresponded from Europe and Asia with many of our daily journals, says: "Every American newspaper man knows, more or less definitely, of the existence of foreign propaganda agencies in this country. . . . Obviously, the one principal purpose of these plants is to poison the wells of truth."

Some specific examples of propaganda in the daily press may serve to enlighten us, and may possibly engender a needed skepticism regarding what we see in newspapers. Nearly any editor will tell you proudly—and he believes it—that his journal gathers into its shuttle the very warp and woof of daily life: this is the newspaper's virtue, that it reflects unfailingly the reality of things as they are.

Our wisest philosophers through all time have been chary in laying claim to the truth, and have jumped for joy when they hoped to approximate it. Even though American newspaper editors may be less meticulous in bandying about a word susceptible of many definitions and of many variations, we still must not expect too much of them. Trained and cool-headed reporters have presented in many instances with extraordinary accuracy accounts of events fresh from the anvil of time. But they did not get their facts from propagandists, so far as ever I've heard.

II

William B. Shearer has a grievance against the press of the United States. It has screened him for two years from that widespread publicity which he doubtless regards as his due. A former civilian naval employee, he takes credit for having wrecked, on behalf of three shipbuilding corporations which had unfinished contracts with this government, the Geneva Conference of 1927 on the limitation of naval armaments. Diplomatic representations were made at that time, they were known to newspaper men, and in the interest of an informed opinion might well have been made public. Shearer's propaganda methods might also have been revealed, as throwing light on newspaper means of arriving at the "truth."

Yet even when Shearer filed a remarkable suit August 21, 1929, charging that he had been paid only about $25,000 by the shipbuilders, and that more than $200,000 was still due him, the action was virtually ignored by the daily press. Not until President Hoover took it personally in hand, with instructions to the Department of Justice to investigate it, and not until a Senate sub-committee began a hearing, were the newspapers compelled, by the very nature of the Washington set-up, to give the facts the publicity they had deserved for more than two years.

This is to be a discussion of certain practices of the daily press in gathering material for publication, and I may as well detail Shearer's methods at Geneva. His shipbuilding employers now say they sent him thither only as an observer; European correspondents who reported the conference say he acted only as a propagandist. He never pretended, according to one of them, "to be other than a protagonist of a big American navy"; and hear this: "Although he did not wear the badge of his employers openly,"—why, if he was only an observer?—"no correspondent in Geneva during the tri-power conference had the slightest doubt that he was in the pay of the sort of people against whom he has now instituted suit"—the sort of people, I may add on my own account, who make a profit from warfare. Shearer exulted at the failure of the conference, and at stories in European papers that he had wrecked it. His suit against the shipbuilders surprised the correspondents; "if, as he says, he was employed to help wreck the conference, the opinion at Geneva would be that he earned his money."

This man established himself in luxurious quarters, and entertained lavishly most of the members of the American delegation, as well as the correspondents of American newspapers. To the latter he handed out almost daily "communiqués," as he called them. The reporters called them aid-memoires, and vowed that they checked his statements and figures before incorporating them in cabled stories, without mentioning that they came from a propagandist for munitions makers.

Lord Bridgeman, former First Lord of the Admiralty and chief of the British delegation, told in a letter to the London *Times* a story that cast some doubt on the thoroughness of the reportorial check-up. "Almost immediately after my announcement of the British proposals on June 20," he says, "a violent attack upon our policy was launched in certain sections of the American press, wherein gross misrepresentations of our objects and of the figures were published with the obvious intention of stirring up ill feeling against Great Britain." At one of his interviews with the correspondents he said Britain did not intend to dispute the claim of the United States to equality in naval strength. "Shortly afterward," he adds, "there appeared in the Chicago *Tribune* a statement to the effect that Bridgeman would never agree to parity, and purporting to be a quotation of my answer at that meeting."

Shearer bore a press card, which admitted him to these meetings, supplied by the jingo Chicago *Tribune* and its deformed New York offspring, the *Daily News*.

Lord Bridgeman was aware of Shearer's activities, and was informed that he was "distributing, widely, violent attacks on British policy and good faith, and monstrous misstatements as to actual proposals." The head of the British delegation then caused representations to be made to Ambassador Hugh Gibson, head of the American delegation, in an effort to silence the propagandist. "It was disappointing," he says, "to find that Shearer still continued to hold his ticket and carry on the same bitter campaign."

Failing to get action through Mr. Gibson, Sir Austen Chamberlain took a course unprecedented in the relations of these two countries. The Foreign Secretary instructed Sir Esme Howard, British Ambassador at Washington, to protest to Secretary of State Kellogg about the behavior of our correspondents in sending unchecked anti-British propaganda to our newspapers. At least two newspapers printed these facts, the New York *Evening Post* and the *World.* Promptly executives of the New York *Times*, *Herald Tribune* and Associated Press asserted that the narratives must have been based on confidential conversations, with no privilege of publication. Raymond Gram Swing and John L. Balderston, who sent the two stories, have reputations quite above the betrayal of a confidence; but at any rate the story was effectually suppressed thereafter.

The New York *Times* has said editorially, since Shearer's activities were effectually exposed, that probably the shipbuilders just sent him to Geneva to get rid of him, because he was a noisy person around their offices; and the *Herald Tribune,* recognized as a big navy paper, has said that "the propagandists for naval construction are the most ineffective ones which could be imagined." Well, Mr. Hoover has asserted that we are spending more for warlike purposes than any European nation, and adds that unless disarmament conferences are successful we shall be spending in 1933 more than $800,000,000 for such purposes—aside from another like sum for veterans—as against $266,000,000 before we fought a war to end war. Seventy-eight per cent. of the national outgo is for conflict, past and future. If it comes to a question of accuracy between the President of the United States and the editors of the *Herald Tribune*, most of us will put our faith in Herbert Hoover. He is one of a select coterie who do not let figures lie to them.

An obvious distinction should be made between the Shearer type of propaganda and what may be called *proper*-ganda. Many of the "hand-outs" accepted by newspaper men constitute legitimate news, soundly informational; and often it is news that would not reach the press if there were no publicity men to prepare it. This is true, to be specific, of most of the material supplied by universities, colleges, libraries and publishers, government departments, and, in many cases, corporations. But when newspaper correspondents are reporting an international conference one purpose of which is to promote world peace, and recklessly accept "hand-outs" from a propagandist whom they understand to represent steel and munition makers, they put themselves in a bad light as gatherers of fact, and they put their papers in a light even worse.

III

Let us consider now another case representative of a different sort of news-gathering, to observe how the newspapers arrived at the "truth" about it. This was the sinking in the Fall of 1928 of the ill-fated *Vestris*.

Two impudent overcrowded cutters, panting from their race down the bay, shouldered alongside the squat *American Shipper* as she lay in the trough of the sea at Quarantine. Agile young men and young women, unfaltering, braved the precarious toeholds of the lowered Jacob's ladders. Photographers encumbered with tripods and cameras, packets of film, kodaks, motion picture machines, even a "talkie," (all of them Machine Age accessories), scrambled over the gunwales, an eager and importunate horde.

Aboard that ship were one hundred and twenty-five survivors of the foundered *Vestris*. Some of them shivered in blankets and deck shawls. Some of them were shoeless, some in boots, some with their feet wrapped in towels. Some wore broken arms in splints. All were of dejected mien, haggard of face. They were fresh from the valley of the shadow of death, and the ordeal had marked them.

Instantly the newcomers surrounded these forlorn figures, plying them with intimate questions. How did it feel to see one's husband sink out of sight to his death, although one's pet dog was saved? Please stand here for your picture; yes, with the dog beside you. Didn't you think it was brave of Captain Carey to go down with his ship? What—*suicide!* Here, boys, this fellow says Cap'n Carey committed suicide. What makes you think so? Didn't dare face you, eh? What—guilty of *plain murder!* Lemme get that straight, now. Murder, did you say? I see, of course, because he didn't send out the S O S as soon as he might. Hey, you, there: How did it feel when your lifeboat capsized?

The reporters and sob-sisters scattered and regrouped, now about this survivor, now excitedly about another who had a madder tale to tell. They overran all the decks, paused a moment about the huddled negroes of the crew, only to turn away in disgust when they found that few of the men spoke English. They were thirsty for details as to how things looked when the weary water-logged ship turned over on her side and disappeared in the churning sea. They wanted to know how the survivors, in the face of such a crisis, *felt*. They turned the machine gun of their queries upon a mother who had seen her baby's body broken and drowned, but she was too weak to talk.

Half an hour later a similar scene was being enacted aboard the *Berlin*, which brought twenty-three survivors. In the early morning hours of the following day it was rehearsed aboard the French tanker *Myriam*, which landed sixty-four worn men and women at a Brooklyn pier. The New York City News Association is authority for the statement that two hundred reporters and photographers were sent out on the story. The revered Associated Press sent two women with its squad, and called its bureaus in Washington, Boston, Philadelphia, Richmond and New Haven to work steadily on the story. Its Latin-American department (the *Vestris* was bound for Buenos Aires) picked up some juicy information from cablegrams dispatched to the families and kinsfolk of survivors. You may be sure the lively United Press was not to be outdone; as for Hearst's International News Service, it put eighteen thousand words of the survivors' stories on its trunk wires.

IV

When reporters work in packs, each eager to get for his paper a story more harrowing than the other; and when the source material of their stories is a group of frightened and nerve-racked persons, accuracy fades from the picture. Fancy the nervous effect, on men and women whose endurance had already been chafed threadbare, of that onslaught aboard the *American Shipper*. Fancy the nervous effect of cameramen like snapping turtles on all sides of them. Fancy the effect, on unstrung temperaments, of experiencing the warm brilliance of the international spotlight. The inevitable effect was hysteria. The inevitable reaction of the American newspaper man was to receive and write as Gospel truth whatever was said in the fever of the occasion, and to "feature" the most irrational utterances. It was even asserted that the ship was carrying contraband munitions to a Latin-American group of revolutionists, and that sharks, in the cold water off the Virginia Capes, harried the survivors. " 'Plain murder,' charge of *Vestris* survivors," shrieked the *World* across eight columns of its first page, and the New York *Times* repeated the ugly charge just beneath its eight-column banner. Said the *Herald Tribune*, in the black two-column "deck" beneath its banner (these were heads of the sort used over World War battles): "Lifeboats smashed, capsized, swimmers driven off and babies crushed to death."

I forbear to quote the terrible tabloids. I prefer to restrict myself to New York's most respectable and trusted newspapers. Morning journals, moreover, have more time for the preparation of news than have afternoon papers, and enjoy a better reputation for responsibility and dependability.

The English press and public saw in the behavior of our newspapers a deliberate conspiracy to besmirch and injure a competing merchant marine. No such suspicion was justified. Our press was merely true to its news-mongering form, and had no design, I feel sure, of causing international ill-will, although probably it did as much in that direction as did Shearer at Geneva.

Although the Shearer fakes and the *Vestris* fakes were typical of the Machine Age, I do not mean to say that untruthful newspaper stories are peculiar to this day and time. Edgar Allan Poe once wrote a notable fake, and prankish reporters have perpetrated many others, before and since then. They did not have wide circulation in an earlier day, because the mechanical means of mass production and distribution were lacking, and so was the commercial urge of sensationalism.

Let me see now whether I can put the *Vestris* disaster into some sort of perspective. During the last century there have been nearly two hundred recorded similar disasters—one hundred and eighty-nine, to be exact—in each of which one hundred or more lives have been lost. On the average, we have witnessed such tragedies, either commensurate in loss of life with that of the *Vestris* or vastly graver, about every seven months. Since radio was put into use on ships, about twenty-five years ago, there have been eight catastrophies of this sort in each of which a thousand or more lives have been lost, in one of them more than three thousand. Please bear in mind that the lives lost on the *Vestris* numbered one hundred and eleven.

No one would minimize the loss of even a single life; and in this case certainly I have no intention to offer any opinion as to the seaworthiness of the *Vestris*, nor as to the judgment of her officers and owners. I am concerned solely with the newspaper treatment of the story. In order to relate it accurately to another similar disaster, in which many Americans were involved, and in which the survivors were brought to the same port, consider these facts:

The *Titanic*, proudest of ocean liners, went down on her maiden voyage four hours after striking, "with a shock incredibly mild," an iceberg in the northern lanes. Her owners had vowed she was unsinkable. There were grave charges of official negligence. This was one of the most terrible events with which the press of the world had to cope prior to the World War. One thousand, five hundred and three lives were lost, amid scenes of heroic devotion and courage; and the death roll included figures of international renown.

I measured three morning New York papers, published the day after the *Titanic* survivors reached port, for purposes of comparison with the stories after the *Vestris* survivors got here. In the first case I measured the old *Herald*, in the second the merged *Herald Tribune*. To my amazement I found that the papers of April 19, 1912, gave actually *less* space to text, pictures and headlines about the *Titanic* survivors than the papers of November 15, 1928, gave to the *Vestris* survivors. The *Vestris* story galloped with some advertising through eight pages of the *World*, thirteen pages of the *Herald Tribune*, fifteen pages of the *Times*.

Diogenes searched for truth with a lantern, in loneliness. The modern American press searches for it with a brass band, close-ups, searchlights, acres of pulpwood thirsty for ink, and squadrons of sob-brothers and sob-sisters. Even Diogenes searched in vain for an honest man. The modern journalistic method sets up a sort of circular hysteria in which reasoned honesty and truth are out of the question. The excitement of the overstimulated victim is communicated to the interviewer, and thence in augmented measure is re-transmitted to the victim, with cumulative effect.

V

Since the World War, when the newspaper readers of this country were made "picture conscious" to a degree never attained before, the ubiquitous camera has played its part as an instrument of truth. Excited and not very well-balanced persons can be induced by the news photographer to pose in nearly any way suggested. For example, a mother has been pictured as holding the rope with which her son had hanged himself. (A rope was taken to her for that specific purpose; the actual rope was in the Coroner's possession.) Even hard-headed persons have been known to succumb to the seduction of the lens. No one will pretend, for example, that Mr. Coolidge pitching hay or wearing chaps and a ten-gallon hat exemplified the truth, the whole truth and nothing but the truth. Yet the American public is regaled with such pictures of its celebrities.

All is vanity; and human vanity is exploited by the press nowadays to an almost unexampled degree in the distortion of fact through the camera. As I looked at the pictures of the *Vestris* survivors I was surprised to see how many of them were looking pleasant please. They were smiling for the benefit of their unseen audience as though many of them had not lost, two days before, members of their immediate families. All the standard-sized newspapers in New York, by the way, announced on their first pages that a page of pictures would be found inside, and told the number of the page. The tabloids printed the pictures outside, of course, and told where the story could be found. The variation in method is negligible.

It has never been quite true, of course—or never since the thirties of the Nineteenth Century—that newspaper technique made for an approximation to the truth. The newspaper "features" its findings, both in headlines and text. It emphasizes the startling rather than the important fact and by that very process gives a lopsided version. This may be necessary in order to attract the reader's attention, but due allowance should be made for it by the reader himself.

Under modern American methods of news inflation, this feature form of distortion becomes an inverted pyramid. Not merely individual stories are twisted out of shape, but the whole news perspective is lost. When from eight to fifteen pages (more than was given to the result of the last national election) are devoted to a prize fight or a marine disaster or a public execution, how is one to judge the comparative value of other tidings, squeezed into a column or less because of the pressure of the main show-window event? On the day that the *Vestris* survivors told their stories, for example, a letter written by President-elect Hoover was made public, deploring sectionalism and pledging his help in the industrial development of the South. Even his most rabidly partisan journalistic supporter, the *Herald Tribune*, gave to that story, foreshadowing a Presidential policy of acute interest to millions of persons, less than a column of space. When the news editor loses all sense of proportion the reader is bewildered and confused. How is one, in such circumstances, to arrive at a just estimate of current events?

VI

To the illness of King George our press devoted for weeks about twice as much space as they devoted to Herbert Hoover's concurrent business trip to the Latin-American republics. On the Sunday after the King's condition became known all the papers I saw printed biographical sketches in the past tense, as though the unfortunate man were already dead. The sketches were incorporated in supplements which had to be put to press well ahead of the date of publication, and there was a chance, of course, that His Majesty might die in the meantime; so they were in fact obituaries. If you think that mere first page publication of the physicians' bulletins would have been a sufficient, and a more dignified, coverage, ask any sentimental shopgirl or middle-aged matron what *she* thinks; or ask any male snob, over whose imagination royalty still exercises a divine right.

In this instance the height of the illness came, from the standpoint of American newspapers, when the King's eldest son reached the bedside. (Our newspapers ignorantly persist in their headlines in referring to this young man as "Wales"; they might as properly refer to former Vice President Dawes as "Illinois.") Let us concede at once that when a son, any son, has "raced with death" by land and sea across the width of the earth, the occasion has distinct "human" interest. Let us concede also that what happens in the sickroom is a private and personal matter, in no wise charged with a public interest, as distinguished from public curiosity. Our newspapers printed so many and such diverse accounts of what happened at the meeting of the King and his son (one news agency advertising that its version was "photographic" in its accuracy), that certainly not all, if any, of them could have been truthful. But it remained for the *World*, two weeks after the incident, to print at the top of its first page, under a two-column headline, "Wales Relates the Story of Meeting with King; Turning Point of Illness," the most touching chronicle of all. The King's eyes were "glazed"; his voice was "faint"; he asked almost in a whisper, "Did you get a lion?"; the Prince couldn't speak; he "just gulped, and then nodded."

"What has been recounted above," said the *World* in its cabled and copyrighted story, "is true; it is not a tale of sentiment . . . there can be no doubt that when this story is generally known, a new romance will be added to the legends of the British Royal House."

But you will be wondering how the Prince happened to tell the *World* all about the meeting, as indicated by the headline. He didn't; the *World* professed to have got the story through an unnamed confidant of the Prince.

VII

The unsparing search of the American press for the truth about the Anglo-French naval entente illustrates a grave aspect of its activities. The entente has long since been officially abandoned, and few Englishmen, I dare say, now pretend to think it was wise. An arrangement by which England should be France's sailor, and France England's soldier—as one French newspaper put it—indicated a recession toward that old European diplomatic polity which the world had already found disastrous. The Manchester *Guardian*, in my opinion a greater newspaper than any we boast, was in the forefront of condemnation when the entente became known; and the situation might well have been left to the mercies of the British and Continental press. But that is not the way of American newspapers, which are incurably meddlesome.

I shall spare the reader quotations from jingoistic editorial utterances in American dailies, and confine myself to two instances. The first deals with the publication by the *World* of a forged letter. This was printed August 25, 1928, and purported to be a "secret note" from Sir Austen Chamberlain to Briand, "revealing" the terms of the entente. It was hawked in vain along Fleet Street. No intelligent English newspaper man could for a moment have been deceived by it. The forgery began "Mon cher Briand," a ridiculous salutation, and was signed "Chamberlain," an equally ridiculous signature, since Sir Austen is not a lord, and such a signature is restricted by British convention to the peerage. Sir Austen is a practiced French scholar, and could readily have written, had he been writing, in French; yet the note said a French translation was enclosed—an affront which not even the sometimes ill-mannered American Department of State would ever offer to the French Foreign Office. The forgery bore within its text many other obvious absurdities.

The correspondent of the *World*, although he said he had the actual text of this curious concoction in his possession, sent only its gist. (The text would have indicated to some readers at least its real nature.) He began a two-thousand-word story thunderingly thus: "What purports to be a secret State document of enormous importance to the peace of the world,"—and said the note told of a plan to pool the British and French navies in all the oceans of the world. The correspondent admitted that the thing might be a hoax, and then added: "It may be said that if forged the text represented the most intelligent diplomatic forgery I have ever seen." The whole story was highly provocative and inflammatory. Why should France and England be pooling their navies, readers must have asked themselves, unless against the American navy?

The apprehensions and suspicions thus set up have not been quieted to this day. A friend of mine, an erudite educator who has devoted a great deal of attention to international and diplomatic affairs, has said to me that he was convinced there was "something" behind that note, even if it were a forgery. It might be a subterfuge on the part of some one who knew the facts yet dared not give out the actual text of the Chamberlain letter. The British Foreign Office, as a fact, denied most emphatically that Sir Austen had ever written any letter to Briand. But the *World* had sown the seed; in some minds, at least, it had found fertile soil.

The second incident involving the entente resulted in the expulsion from France of a Hearst reporter, and the arraignment on a technical charge of espionage of two subordinate diplomatic officials, charged with selling him a confidential document. Although Mr. Hearst is on record as being hospitable to forged State documents, this one, it so happened, was genuine. It was the instructions sent by the Foreign Office to its ambassadors and ministers in alien lands regarding the naval understanding with Great Britain. Men who profess to any sort of standards will not read, much less spread broadcast, a confidential paper which comes into their hands; but the Hearst press, in its devoted pursuit of truth, was not only eager to publish the document but, according to the testimony, bribed French officials in order to get it. The story was sent to the New York *American* on September 20, 1928, with the approval of Mr. Hearst, who was in Paris. On the following October 10, seeking to justify that kind of truthfulness, the *American* printed an editorial in large type under a two-column head, in which it asserted:

"This newspaper is satisfied with the part it played in exposing the plot of the British Tory Government to ally England with

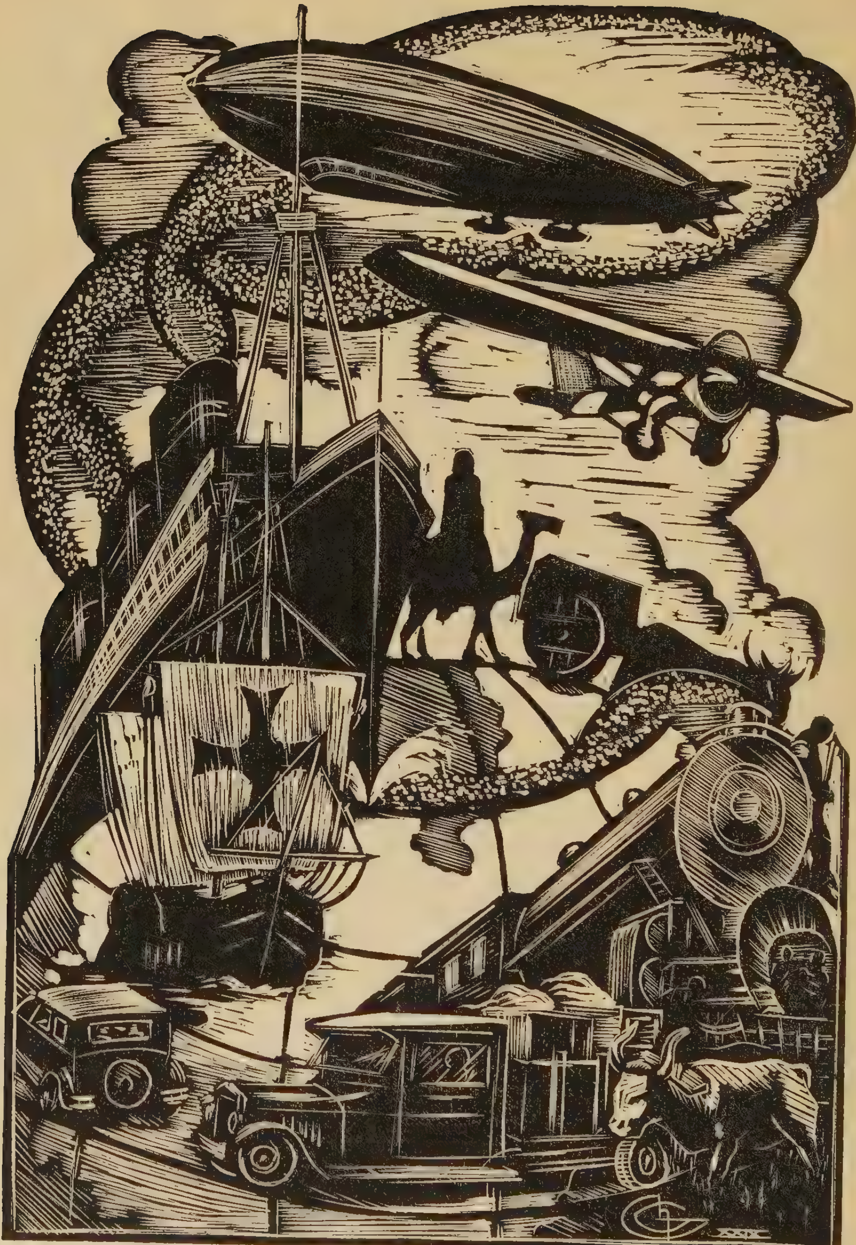
France instead of with America. The chorus of protests of newspapers in both Anglo-Saxon countries is eloquent evidence of what the people themselves think about it. By arresting and deporting our Paris correspondent, the French Government testifies to the service he rendered his country."

From that editorial one might suppose that the "chorus of protests" in both Anglo-Saxon countries was of a single tone and temper. It was not. It was dissonant. The nationalistic and junker press in this country shrieked its alarm and twisted the lion's tail. The British press expressed its contempt and anger at Hearst newspaper methods.

VIII

Mr. Coolidge's reaction to our newspaper fanfare over the naval entente was a truculent Armistice Day speech and a demand on Congress for fifteen bigger and better cruisers, to cost a quarter of a billion dollars. Shearer lobbied for this bill. Yet both France and Britain entered their naval agreement with an explicit understanding that it would be abandoned if the United States objected to it—a part of the truth which our press for the most part strangely ignored. The British reaction to the "truth" about the *Vestris*, man-eating sharks and all (scientists are in great doubt as to whether sharks will attack living human beings, even in tropic waters), was a sense of bitter outrage. Yet this disaster, had events been permitted to take the course prescribed by international law, would have awaited the subsequent ordered examination of the British Board of Trade, which revealed under oath the amazing misstatements made by our press under the urge for journalistic fact; so that we find our newspapers acting time and again as Paul Prys and agents provocateurs.

As for the propagandist, Dr. Ellis, whom I quoted at the outset of this paper, would have him abolished from the international scene; other editors would herd him and all his fellows to a cliff and drive them over it into the sea like Gadarene swine. Still others suggest that American newspaper men be taught to distinguish between faking and fact. Probably the last suggestion is the most practicable, for the distortion of truth in our daily press arises partly from gullibility, partly from over-emphasis on the emotional rather than the intellectual content of news. The methods adopted by our dailies as scavengers of scandal and sensation are in part a consequence of the merciless competitive conditions under which they function. Such methods defeat a fundamental justification of diurnal journalism. They defeat that cool accuracy upon which the press might build once more a substantial liking and respect among its readers. They tend to plaster with mud and distortion the truth which might shine, if it could, through the newspaper story. Victory in showmanship and salesmanship has brought a woeful failure in the newspaper's chosen field.



CHAPTER TEN

TRANSPORTATION: From Drag to Airplane

The chariots shall rage in the streets, they shall justle one against another in the broad ways; they shall seem like torches, they shall run like the lightnings.—Nah. 2:4.

I

NOWHERE has man's fertility in resources been exhibited more vividly than in the field of transportation. Nowhere has his genius for invention brought more revolutionary changes. Nowhere has the machine more profoundly affected his economic, political, and cultural life. Mobile mechanics has vanquished the American frontier, shifted populations, constructed paved highways, developed the factory system, instituted new divisions of labor, lifted mass production to its peak, brought urban congestion and sudden death, flung the skyscraper heavenward, constructed suburbs, linked continents by water and by air, shrunk time and space. From the primitive drag to Bleriot's monoplane is the history, in effect, of recorded human progress.

The forward steps may be chronicled roughly as embodied in the dugout and canoe, the sailing ship, the locomotive, Fulton's *Clermont*, the electric street railway, elevated system and subway, the automobile, the airplane. In turn these formed the foundation stones of Phœnician, Greek, and Roman civilizations, of the British Empire and of the industrial system in the United States. Their most momentous victories, however, have come since the application of steam motive power near the beginning of the Nineteenth Century. On land these victories have rolled with the wheel.

No one can tell us who first thought of the wheel. Perhaps it was a development from the use of roller logs. It ranks with fire, metals, type, as a primary human achievement. It is primary not only on account of its importance but because its age is conceded to be at least two hundred millennia. At first it was a solid circular disk, but we know that three thousand years before Christ the spoke-wheel was being used, and that metal tires were employed to give it stability. The Greeks learned to make their wheels of bronze instead of oak. In some parts of Mexico even now a primitive cart is used with wheels very like some Virgil described. But in more advanced communities the wheel is the Alpha and Omega of transportation, even of transportation through the air, since airplanes cannot as yet rise or alight without its help.

Yet for a vast stretch of time the wheel did little service to the causes of commerce. It was employed on city streets, to move produce from near-by farms, and for the purposes of imperial pomp. That was practically a roadless era. Such roads as there were led to sacred places, or were constructed for military purposes. Man had learned how to keep himself afloat, first with the raft, then with contraptions supported by inflated leather skins, then with the dugout and canoe—all these for use on rivers and lakes. Once he found he could use winds as a motive power he braved the seas in ships. A thousand years before our era vessels constructed of the cedars of Lebanon plied the Mediterranean and gave to a confederacy of cities on the coast of southern Syria a sort of immortality. The Phœnicians, boldest navigators of their time, established colonies all along the sea, in Cyprus, Crete, even in England. A tiny country nowhere more than thirty-five miles wide and two hundred long, skilled in the use of tools and primitive machines, was celebrated then and is to-day because it was preëminent in transportation.

II

Ships with masts and shrouds, made with tools and primitive machines, made possible historic voyages of discovery and the colonization of the United States. Columbus, seeking a new trade route, landed on these shores October 12, 1492, after spending seventy-one days crossing the Atlantic; now we do it in less than five days by water. More than a quarter of a century after Columbus made his journey to the unknown world Magellan set out, on August 10, 1519, from Seville to circumnavigate the globe. Intermeddling in a quarrel in the Philippines, he lost his life, after having spent five and one-half weeks getting through the three hundred and twenty miles of strait which to-day bears his name; and of his five ships only one returned to Seville, with but eighteen men alive of the original two hundred and thirty-seven adventurers. The round trip had required three years and twenty-nine days.

Nor did Sir Francis Drake do much better, for he clipped only a few months from the time of the Magellan expedition. He was a freebooter, and was seeking, not a new route but old loot; and he got back to England on November 3, 1580, with but one of the five ships of his flotilla. After that circumnavigations by water became frequent; but when Jules Verne, in the '70's of the last century, wrote a story about a trip around the world in eighty days he himself and all who read it regarded it as a flight of the imagination. Nellie Bly, whose real name was Elizabeth Cochrane, beat that fictional record by seventy-two days and a fraction, as a newspaper stunt for the elder Joseph Pulitzer. It was not until the Spring of 1924 that four United States army airplanes set out from Seattle to circle the globe; and but two of these, after an absence of nearly six months, returned. They had traveled twenty-six thousand three hundred and forty-five miles in three hundred and sixty-three hours of flying time. Their pilots were the aërial successors of Magellan.

Masts from Maine forests bolstered Britain's mastery of the sea. Back in 1666 Pepys made an entry in his diary: "There is also the very good news of four New England ships come home safe to Falmouth with masts for the King; which is a blessing mighty unexpected, and without which, if for nothing else, we must have failed next year. But God be praised. . . ." And another writer asserted that the pines of Maine prevented the Little Corporal from invading England.

Sailing ships may still be seen in nearly any port of the Seven Seas, but after the steam engine was applied to navigation, in the latter part of the Eighteenth Century, it well-nigh supplanted the three-master. When the Founding Fathers were worrying over the Constitution in Philadelphia, back in 1787, some of them left the state house one August afternoon to watch a trial of John Fitch's boat. Steam leaked from the wooden pistons, but nevertheless caused twelve long oars to dip with a paddling motion into the Delaware; and one of the observers said the thing actually ran seven miles an hour. The incident hardly made a dent on their consciousness, and none on history. George Washington paid no attention to it because he was preoccupied with James Rumsey's efforts to devise a craft that would utilize steam in a quite different way. It was not until August 11, 1807, that Robert Fulton's *Clermont* made a successful trip from New York to Albany, and that is the event that history acclaims.

For a generation, however, there was little faith in marine engines. In 1830 Samuel Cunard tried to get a contract to carry mails from London to Boston in steamships instead of in the brigs then in use. It was not until July 4, 1840, that he succeeded. The first trip was made by a vessel 207 feet long, fitted with 740-horsepower side-lever engines, with a speed of 8½ knots and consuming 38 tons of coal daily. The voyage was made in 14 days and 8 hours.

By 1889 the *Teutonic* and the *Majestic* of the White Star line journeyed from London to New York in less than 6 days. By 1907 the Cunarder *Mauretania*, equipped with turbine engines, had cut nearly a day from that record and was dubbed a greyhound. Liners of 80,000 tons, so long that New York must lengthen her piers to berth them, so big that they can carry 5,000 passengers and a crew of 2,000, are the latest development. Staterooms are to be equipped with wireless telephones, so that a talk from the ocean with one's home or office will be possible. Beds have succeeded bunks, windows the porthole. Swimming pools, gymnasiums, lounges and dance halls are provided for the health and pleasure of passengers. No longer does sooty smoke belch from the stacks of these liners. They use electricity or oil or a combination of the two for their motive power. Once set on a given course, they may maintain it automatically and unerringly, without human interference, by the use of the gyroscopic compass. The mechanical steersman is surer than the human.

The comfort and security of ocean travel account largely for the fact that half a million Americans go abroad each year, whereas in the nineties the number was hardly fifty thousand. Tourists nowadays spend annually three-quarters of a billion dollars irritating and enriching other countries, and helping to settle international balances. Americans returning from Europe outnumber the immigrants. Since the vast migration westward was stemmed by the restrictive immigration law of 1924 there has been an increasing movement of Americans to Europe, though not to remain there.

III

Watt's condensing engine, devised for use in English collieries, was adapted first to ships because navigation was an almost immemorial art. Not until 1814—on July 25—was the first successful trial made of George Stephenson's "traveling engine." This was over a nine-mile tramroad from the Killingworth coal pit in England to the port. Not until September 27, 1825, did the Stockton and Darlington railway carry the world's first passengers and freight by steam locomotion. Not until May 24, 1830, did the Baltimore and Ohio Railroad operate the first steam-drawn train in this country, between Baltimore and Ellicott Mills, a distance of ten miles. Two years later we still had but twenty-three miles of line; ten years later we had nearly three thousand miles, consisting of short-haul, single-track roads between large cities; by 1890 we had one hundred and sixty-three thousand five hundred and sixty-two miles, more than all Europe, nearly half the mileage of the world. The American frontier had disappeared.

For many years St. Louis was the western railhead. Thence mail was sent by pony express and stage coach to settlements further on; thence pioneers set out in covered wagons to confront the perils of want, thirst, and the red Indian. But many were stranded there on the way to conquer the West, so that a former Mayor left a third of his fortune for the relief of "worthy and distressed travelers" and immigrants. Apparently he supposed St. Louis would always remain the western terminus of our railroads. That was still true when he died, midway of the Nineteenth Century; but the roads soon pushed onward, and stranded pioneers became rare. After a time there were no claimants for help from his fund, amounting to more than a million dollars, and the trustees were unable to devote it legally to other purposes than the will specified. The railroads had undone the philanthropist's good intentions. The greater part of the income went for administration and court costs, since there must be legal permission even to sell a parcel of real estate.

That was not the only case in which transportation initiative defeated praiseworthy purposes. An executive of the Pennsylvania system, observing with sympathy that train crews suffered a high mortality rate, built an asylum for orphans whose fathers had thus lost their lives. But railroading was soon made so safe that the orphanage had to advertise for unfortunates, and even so could not fill its quarters. Something of that sort has happened to another American philanthropy, established for sailors. Robert Richard Randall, son of a reputed pirate, had the advice of Alexander Hamilton when he made a will founding a refuge—Sailors' Snug Harbor, on Staten Island—for men of the sea in their old age. But the sort of sailor he designated has become obsolescent. A fund amounting now to more than fifty million dollars is devoted to the care and comfort of about one hundred beneficiaries. Transportation in its seven league boots has outstripped the philanthropic vision of lords and ladies bountiful.

The St. Louis philanthropist ought to have known better; for as soon as public confidence in steam railways was established the advantages of a transcontinental system began to be discussed. The main dispute was as to whether a northern or southern route should be taken. Congress settled that issue in 1862 by passing the Union Pacific bill, granting princely subsidies to the road for construction through Nebraska, Utah and Nevada to California. The northern route had won, and eastern manufacturers were jubilant. On May 10, 1869, gangs of laborers working east and west met at Promontory Point, near Ogden, Utah, and united their tracks amid ceremonies of rejoicing. Fifteen years later the Southern Pacific gave New Orleans an outlet to the Coast; the Atchison, Topeka and Santa Fé ran from the Mississippi to the Coast; and the Northern Pacific linked the Great Lakes with Puget Sound. The Iron Horse had galloped roughshod over the Covered Wagon.

From the eastern United States a steady stream followed the railroads as they stretched their steel fingers into the West. From Europe hordes of immigrants came to homestead Government lands. What had been scattered and insecure settlements blossomed into cities. And not less marked than these shifts of population was the effect on industry. With swift and economical distribution of commodities assured, with assured markets in the South, the West and the Orient, the factory system soared and roared. Midwestern and northwestern farmers sent their pork and cattle, corn and wheat swiftly to market through easy channels, accumulated their profits, and became town-dwellers. They were prosperous. Their children forgot that there had been hardships in the parental pioneer life.

Then came the empire builders, Hill and Harriman and Morgan, the first to begin an immense colonization project which settled still more thickly the valleys and the plateaus of the West. The three were consolidators. They merged railroads, fought fiercely in Wall Street and dreamed of world-girdling transportation systems. They and their fellow captains rebated to favored shippers, corrupted legislatures or sent their lobbyists into the cloakrooms of Congress. Farmers complained bitterly of rate discriminations, and organized to fight the whole system, with its fattened profits. William Jennings Bryan and Charles Gates Dawes were the opposing lawyers in one such case, and oddly it was Bryan who represented the railroad. Abraham Lincoln, for that matter, had represented a railroad before the Illinois Legislature. There was no disgrace, evidently, in being attorney for a transportation system.

From the first, the railroad did more for the manufacturer than for the agriculturist. It snatched the crown from the head of King Cotton and seated industrialism upon the throne. The planter and the farmer struggled in Congress for some effective Federal means of curbing railroad corruption, supervising operation and regulating rates. The fight was long drawn, but in 1887 the Interstate Commerce Commission began functioning as the first of a congeries of such bureaus, born of the machine.

Prior to this, to be sure, most States had set up their own commerce commissions, which operated without regard one for another. Even the rates fixed by these bodies varied. The railroads and their stockholders complained, and Charles A. Beard quotes the New York *Nation* as speaking for them when it said that this was "confiscation, or, if another phrase be more agreeable, the change of railroads from pieces of private property, owned and managed for the benefit of those who have invested their money in them, into eleemosynary or charitable corporations, managed for the benefit of a particular class of applicants for outdoor relief—the farmers. If . . . we are going back to a condition of society in which the only sort of property which we can call our own is that which we can make our own by physical possession, it is certainly important to every one to know it, and the only body which can tell us is the Supreme Court at Washington." But the Supreme Court upheld the State commissions, and then Congress, despite protests like the *Nation's* and despite the presence of lobbyists who gave dinners and lost generously at poker, created the Interstate Commerce Commission. Thereafter a railroad could not even issue new stock without official permission.

But worse things were to come, from the railroad standpoint. First the automobile and then the airplane cut in on profits and prestige. Accepting the Biblical advice to agree with thine adversary, the railroad made terms with both of them, and worked

in coöperation rather than hopelessly against them. I say hopelessly because, even with twenty billion dollars invested in our rail lines—too big a stake to be lost without a struggle—it was only by combination rather than warfare that the railway systems could avoid a ruinous competition. When Warren L. Stone was president of the Brotherhood of Locomotive Engineers, a year or so before his death, he told me that his organization foresaw the possibility that the airplane might supplant the railroad altogether, and was preparing to make the change to flying if need be. But let us see first about the automobile.

IV

After a fashion the way was smoothed for the automobile by the bicycle. In the days when Coventry, England, was the center of watch and sewing machine manufacture, a young man returned from Paris with a curious contraption which he called a velocipede. A relative in a sewing machine firm undertook to manufacture a few of them, and the result was that the factory was soon devoted solely to the new-fangled machine. Then came the bicycle, at first with a huge wheel in front and a small one behind, a monstrous and extremely unsafe contrivance. Not until the "safety" bicycle was devised did the machine become a popular fad. It was a fad so far as this country was concerned, but England still boasts some seven million ardent pedalers. Coventry is the chief bicycle-manufacturing city of the world, and has been from the first. When the internal combustion engine was invented, bicycle factories in England and the United States had some experience and skill with which to meet the problems presented by the "horseless carriage."

Not that experiments looking to the automobile hadn't begun even before the velocipede was invented. Before 1770 Captain Cugnot built three in France; in 1787 Oliver Evans drove one through Market Street in Philadelphia; in 1823 William Henry James patented a "road locomotive" in England; in Germany Carl Benz built the first internal combustion motor car in 1885; in Rochester, New York, George Baldwin Selden took out an American patent in 1879. The thing was of slow growth, and did not become an industry until the nineties of the Nineteenth Century. And the early machines were subjected to rather more derision than is the usual lot of such innovations. When William C. Durant said that some day half a million automobiles would be manufactured annually in the United States, George W. Perkins was shocked. "If he has any sense," the financier growled, "he'll keep these notions to himself, in case he ever wants to borrow any money." (In 1928 we produced nine times as many cars as Durant predicted, with thousands to spare.) Walter Flanders told Henry Ford: "This new plaything of yours won't sell." (Ford had already, before 1929, sold fifteen millions of 'em.) Frederick J. Haynes refused a job with Ford because he didn't see how the man could possibly pay the proffered salary of twenty-five hundred dollars a year. Chauncey Depew, advising a nephew not to invest five thousand dollars in automobile stock, said oracularly: "Nothing has come along to beat the horse." J. P. Morgan & Company refused to buy in 1908 five million dollars' worth of automobile securities now worth two hundred millions. McManus and Beasley, in their book on *Men, Money and Motors*, from which I have gleaned these facts, observe:

> Heraldry has gone. The sturdy trek behind the covered wagon is no more. Business has become the last great heroism. In its beginnings the automobile business was as were—and will be—the beginnings of all businesses, a conflict of the hard-muscled and strong-willed, for only they will survive.

Survival meant, for one thing, taking the automobile out of the luxury class and making it a necessity, which it now is. It has quite altered the economic and industrial reflexes of this country, as well as its social life. It has made the suburb possible for city dwellers, changed country life, and brought about the construction of hard roads throughout the United States. It has given birth to a million roadhouses. It has evoked a new vocabulary, in the forefront of which is "joyrider"; and it has meekly taken the blame for a lot of the faults attributed to the Younger Generation. It has given us the ubiquitous taxicab, and all but driven the beloved horse from our streets. It has been estimated that New York City's taxi bill was one hundred and sixty million dollars in 1928, a sum greater than the revenues of all the subways, elevated lines, and surface systems there.

And it has caused a costly urban traffic congestion, for which every city dweller pays an unseen and often unrealized tax. New York, it is estimated, loses half a billion annually from this, Chicago three hundred million, Boston twenty-five million. Since all traffic at street level must stand still while traffic in the other direction is moving, a truck or a "pleasure" car is only half a truck or car. And when you realize that you must pay more in nearly any large city to get a ton of coal from the railroad to your home than the railroad has received for moving it from the mines to your city, you will get a glimpse of your part in the unseen tax. You have to help pay, moreover, for that lost half-truck, if it is carrying something you are to consume. Not the so-called "crime wave" but traffic congestion is every large city's major problem.

V

Losses from congestion can be estimated, roughly, in dollars. How are we to estimate the losses in energy, in fatigue, in headaches from the inhalation of poisonous gases discharged from the motors, in the loss of life and limb? In 1928 there were 25,800 automobile fatalities in the United States, and sixty-five per cent. of them were of pedestrians. Only thirteen per cent. were from automobile collisions, only four per cent. from collisions with trains, with the remaining deaths resulting from accidents in which there was no collision. The rate of accidents from burns, drownings, railroads and street cars decreased from twenty to fifty per cent. from the preceding year; only the rate of accidents from automobiles increased, and it increased in greater proportion than the increase in the number of cars and trucks. There were, at the end of the year, twenty million passenger cars alone in operation on our streets and highways.

These twenty million passenger cars do not, of course, measure the output of our factories. Three million machines manufactured in this country are running in alien lands. During 1928 half a billion dollars' worth were sold and distributed abroad. You may now travel from Bagdad to Damascus by motor if the camel's slow undulation is disagreeable. "We Fix Flats," say signs along the road from Rangoon to Mandalay. In the jungles of Papua there were, at the beginning of 1929, one hundred and thirty-five motor cars. In Shanghai and Hongkong, in Osaka and Melbourne, in the Fiji Islands and Iceland and Afghanistan, in Persia and Morocco, the pervasive American automobile is to be found. General Motors alone is in business in one hundred and four countries.

Nor is the finished car the only product of the automobile factory. Ford, pioneer in mass production, who owns or produces everything that goes into his machine (having thus a "vertical" trust), and who devised the system by which the body and motor and chassis are handled by different groups as they move along an assembly line, produces also these by-products: Coal tar, ammonium sulphate, motor benzol, illuminating gas, coke, charcoal briquets, hardwood pitch, wood alcohol, calcium acetate, Portland cement, and slag (for grading roads); his profits from these run into the millions annually. He manufactures, in addition to automobiles, plate glass, paper, and pig iron. From his coal mines he unearthed in 1928 nearly three million tons of fuel.

With Ford and his competitors producing 4,600,000 cars in a single year, how (assuming that room can be found for them to move about the streets) are they to be housed in crowded cities? Well, New York City has a twenty-four-story garage, centrally located, where cars are received and delivered at the ground level. The customer shuts off his motor when he surrenders it, and it is not started again until the customer starts it. An electric parker places and delivers it, and delivery at the street level is guaranteed in three minutes, from any part of the garage! Some department stores provide parking spaces for their customers. To maintain an automobile in New York, with a chauffeur, costs about $5,000 a year.

Passenger cars cut in heavily on railroad revenues, since many persons now tour in them and use them for commuting; but it was the bus with which the railroad joined hands. At the middle of 1929 there were more than 100,000 motor buses in the United States, and sixty railroads owned 2,200 of them. In the aggregate the buses covered some 800,000 miles of route, and it was estimated that during the year they would roll up a mileage of a billion and three-quarters, carrying about 1,800,000,000 passengers. Some of them belonged to schools and local operators, but the majority were in interurban or long-distance service. In long-distance rides the bus fare was about 60 per cent. of railroad fare, counting sleeping accommodations for neither. On transcontinental trails, where perhaps half a dozen covered Conestoga wagons passed in pioneer days, a thousand motor buses now whirl along in the same length of time, each with a capacity of 20 to 36 passengers. They have, indeed, brought into being a new traveling public.

We have a new disease (or are said to have it), as a result of all this motoring. It is called "autotosis." The State Department of Public Health in California coined the word, and said that the symptoms were headaches, dizziness and that tired feeling. The cause assigned was a modified carbon monoxide poisoning, from breathing air tainted with the exhaust from automobiles. And the French have a word for air-sickness, to correspond with sea-sickness. But it is probable that air-sickness will become obsolescent as the plane is further improved, except in extremely rough weather. I have flown in Europe in a plane that moved as smoothly as an automobile over a concrete road.

VI

Flying was in its pinfeathers until the World War. At the outbreak of that crisis the art was ten years and eight months old, dating it from the first flight the Wrights made from the North Carolina sand dunes. The imperative necessity that armies be supplied with eyes in the air so stimulated the imagination and spurred the energies of men that the planes were improved with amazing rapidity. They became not only the eyes of armies but their scouts; and the aërial encounters of brilliant "aces" on both sides were the outstanding individual feats of a conflict that had been mechanized until individuals counted for little on the ground.

In the United States the development of airplane manufacture as an industry dates back not further than 1923; yet in 1928, according to the National City Bank, this baby industry made a higher rate of profits than any other. The computation was based on the "net worth" of each industrial group: that is, by taking the capital stock outstanding and surplus account of each company whose profit figures were available. Thus it was found that the aviation industry had paid 34 per cent. profits on "net worth," while automobiles, next in line, paid but 27.9, industrial chemicals 17, tobacco 13, flour and bakeries 21 and copper mining 13. The value of the output of planes for that year was put by the Department of Commerce at $43,812,318, the selling price of 4,346 craft. Of these 107 were seaplanes. Two years before, only 1,125 land- and 61 seaplanes had been turned out, with an aggregate value of $8,871,027.

The processes of manufacture, moreover, are now standardized and on a mass production basis. The first to do this was the Fairchild Airplane Manufacturing Corporation at its Farmingdale, Long Island, plant. A former engineer for the Ford Motor Company rearranged and reëquipped the factory, with three assembly lines, one for each model, along which the units moved hour by hour in a steady stream from stock room to paint shop. Mechanics stationed along the lines quickly and efficiently did their part before the plane passed on to the next station. The industry had reached a point where production in quantity justified the abolition of the "custom-built" machine.

The chief use of the commercial plane, obviously, is as a mail carrier. Pilots flying by compass, guided by revolving beacons, covered more than twenty-six thousand miles a day at the beginning of 1929, delivered New York letters in San Francisco in thirty-three hours, and flew so accurately to schedule that farmers beneath set their watches by them. During 1928 they carried three million pounds of mail; during the preceding year they had carried only a little more than half as much. In large measure the increase was due to the decrease in "sky-postage."

Twenty-seven private air transportation companies were contracting with the Post Office Department for this work. But they were by no means the sum of recognized manufacturers in that field, for there were sixty of them. The others were not idle, for they had to meet the demands of taxi operators, merchants, manufacturers, bankers, miners and lumber executives. Mining concerns in New Mexico, Nevada and Arizona, for example, found aircraft invaluable in delivering to well-nigh inaccessible pits food, drills, repair parts, and hospital supplies. Such pits are easily accessible, of course, to the plane, which takes no heed of canyons or of mountains.

Lumbermen, too, used airplanes to transport men and equipment, as well as to cruise over their domains and map them. The aërial camera was greatly improved after the World War, and may now, from a height of 20,000 feet, take photographs that when enlarged show in detail roads and sheds. Aërial maps are used for town planning, in court as evidence, and for tax revaluation. Manhattan Island was photographed from the air for the last-named purpose.

In commerce and industry the airplane was found valuable for the executive and the salesman alike. Since an overnight trip is an overnight trip, and time lost from the business standpoint, the plane has been found useful in pulling together, within that space, cities twice as far apart as those that could be reached by train. Some executives commute regularly through the air. Many have their private machines. Those who think we are speed-mad now may well pause to consider what vertiginous movement we may achieve, say, in 1940.

The first President of the United States was a surveyor, but he lacked modern accessories. Government airplanes, for example, discovered in 1929 a water-power site, until then not known, of 20,000 horsepower. They were making an aërial survey with cameras of Alaska, and in its little-known southeastern portion found this untapped wealth. It was in the Tongass National Forest, which may in time prove a lifesaver for American newspaper proprietors. Publishers of our daily press appear to do nothing toward solving their wood-pulp problem, but Uncle Sam has done something for them. This national forest, it is estimated, can supply one-fourth of their needs forever, if the wood is cut no faster than it grows. Thus the newspaper industry will have an unceasing supply for at least a part of its needs; perhaps the corn stalk will supply the balance. For the Alaskan raw material the publishers must thank, primarily, the airplane; and the power is at hand to fell the trees.

VII

Having learned "the way of an eagle in the air," man proposes to profit by it in still other ways. His Dædalian achievements already show handsome dividends. Yet it must be admitted that they have some drawbacks. The noise of airplanes overhead threatens to become a national nuisance. There is no reason why the motor of an airplane shouldn't be muffled as easily as the motor of an automobile. But that is not the whole problem, for the propellers are responsible in part. The governments of all the principal nations are at work, as a military precaution, to silence the plane. With four- and six-bladed propellers of small size, instead of the two long blades now in common use, the noise has been reduced; and by redesigning the plane to eliminate projections and wires, further gains have been made.

Great Britain and France outrank this country in the number of military planes, but we have more factories for all purposes than both of them together, and we lead the world in the number of miles flown daily over commercial routes. Only Germany surpassed us, at the beginning of 1929, in the number of passengers and tonnage of freight carried. Yet the United States did not subsidize aviation, as did nearly every European country. All we did was to put at the disposal of manufacturers the best engineering brains Washington could command.

How, then, about the railroad and the airplane? On June 14, 1929, the Universal Aviation Corporation, in coöperation with the New York Central and the Atchison, Topeka and Santa Fé railroads, inaugurated a joint service, by rail to Cleveland, by air to Garden City, Kansas, by rail to Santa Fé and by air to Los

Angeles. The Pennsylvania system had contracted with the Transcontinental Air Transportation Company to institute a similar service in the spring of 1930 to the coast, by a route through Columbus, Dodge City and Las Vegas. The time required is about half that for all-rail transportation, the cost about twice as great.

During this century a noteworthy step forward has come in the invention of the Diesel engine, which burns cheap fuel oil. It has been put to sporadic use in all forms of transportation, including the railroad locomotive. The oil is sprayed directly into the cylinders when the pistons are near the top of their stroke, where the heat of compression ignites it; for the compression pressure here is five hundred pounds to the square inch, compared with ninety pounds in the ordinary gasoline engine. The first Diesels were installed in the United States early in the Twentieth Century, but it was more than twenty years before they found a widening market in power plants, automobiles, airplanes and on railroads.

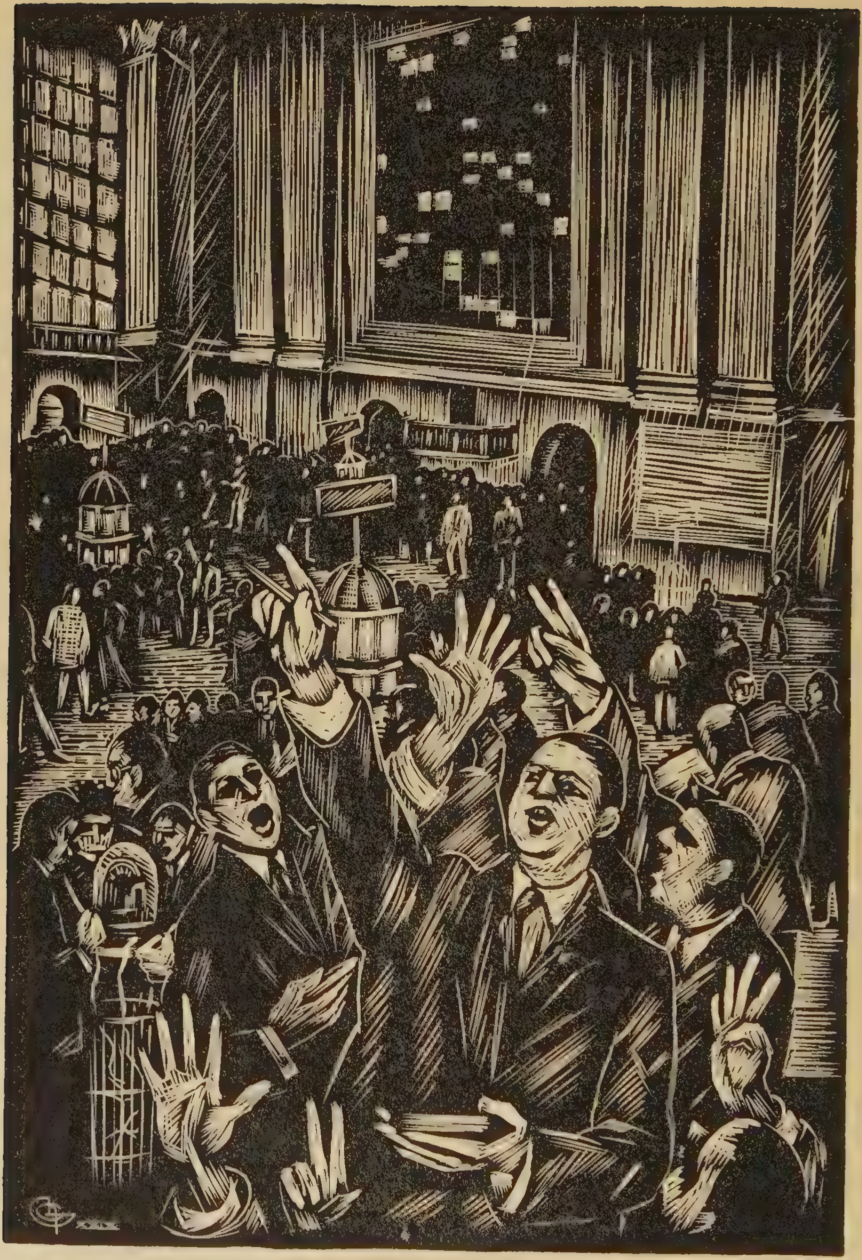
"The civilized man has built a coach," said Emerson, "but has lost the use of his feet. . . . It may be a question whether machinery does not encumber." Thus did a New England transcendentalist anticipate by more than half a century those publicists who to-day decry the Machine Age. But tennis stars, track teams, channel swimmers and the hurrying throngs along our city streets belie the gloomy prognosis that man has lost his feet. If engines driven by steam, gas, and oil have robbed the seas of the romance of sailing ships, they have helped to make possible a continuing exodus from one country to another.

VIII

These are the physical and economic facts about transportation by air; what of its imponderables? How are we to evaluate Colonel Charles A. Lindbergh's importance to the boyhood of America? There was a hero, unassuming, courageous, wise, suited to stir the imagination and ambition of every youth in the land. Not that he didn't stir others, too, and supply the daily press with a profitable budget of thrilling news. There were Maitland and Goebel and Byrd, Chamberlain and other fliers who helped not only to supply the populace with an aërial pantheon, but to make the whole country "air-conscious"—a necessary step in the progress of this form of transportation.

There remains for brief consideration the matter of urban transit. The city bus is replacing to a large extent surface transportation; it is more mobile and quite as fast. The elevated structure, which at first used steam engines, has been recognized as an eyesore and is threatened with extinction. The subway, constructed in the naïve notion that it would relieve congestion, has been found only to increase it, and is the main factor in the creation of the skyscraper. In every large city and in many smaller ones the matter of getting hordes of workers onto the job of a week-day morning and getting them back home at night is turning heads gray. In the distant future, with the probable decentralization of industry and commerce, the airplane may be of service in solving the problem; at present the automobile, owing to traffic congestion, seems but a makeshift. Perhaps the answer lies in making a mole of man on his way to and from work, and transporting him solely underground.

Long have been the forward leaps of humankind in transportation. Many have been the problems solved. Yet with each solution new issues have sprung forth. Scores of city-planning commissions are trying to meet the social aspect, scores of politicians to cope with the questions in their field, scores of financiers to remedy the economic implications. Success is pretty sure to come in time to these groups. Amid the tension and hurry of city life there are those who are inclined to condemn too hastily the mobile machine, which is chiefly responsible for modern urban evils. They forget its manifest and manifold benefits.



CHAPTER ELEVEN

COMMERCE: From Barter to the Chain System

I

NAPOLEON said contemptuously that England was a nation of shopkeepers. Throughout the civilized world there are those who deride the United States as a country preoccupied with manufacture and trade. Yet there is a lot to be said for commerce, as exemplified in this Machine Age, and particularly for international trade. There was a great deal to be said for it, indeed, before the machine came into its heritage; for the art of printing followed the paths of the great silk caravans from China into the western world, and through commercial intercourse nations become acquainted, acquire friendships, and blunt the edge of those misunderstandings which lead too often to conflict. Merely in its domestic aspect, commerce eases life of a million inconveniences, and its slogan is service.

Commerce is but a division of labor, whereby certain commodities are produced in suitable areas by particular groups, and the surplus exchanged for commodities produced elsewhere. We are the Abou ben Adhem of modern trade, the world's biggest buyers and sellers of goods. Within our own borders more than ten million persons are engaged in the processes of distribution alone; and our exports in 1928 amounted to more than five billion dollars, as against about four billions imported. Europe bought more than two and one-third billion dollars' worth of our goods, North America—principally Canada and Cuba—nearly one and one-third billions, Asia nearly two-thirds of a billion, South America less than one half. We had considerably above a billion dollars of "favorable" balance, as it is called, although the term is somewhat deceptive; an even balance is more to be desired.

But that we had it, and met it through "invisible" agencies, such as half a billion dollars spent by our tourists in alien lands, the use of foreign ships and the purchase of foreign insurance, was due primarily to the machine. It was the largest "favorable" balance in our history, save in 1922. What we imported was chiefly raw materials for the insatiable maw of our factories and mills; what we exported was chiefly manufactured commodities, made of these and other raw materials, plus the value added by manufacture: the value, that is to say, created by the machine.

Perhaps the intellectual would speak a little less disparagingly of tradespeople if suddenly all commercial operations were suspended. In New York City alone there are 4,338 kinds of businesses, not all of them commercial; some are industrial, for the metropolis has many factories. Commerce could not be suspended for long, lest our population starve before its clothes could be worn threadbare. But if there were a sort of unexpected moratorium in the shops, say, for two days, so that we could not replenish our supply of cigarettes, ride in a trolley car or on an elevated or underground by subway—for if trade were paralyzed these transit lines would have no occasion for running—or quench our thirst at a soda fountain, or pick up a magazine or book to while away an evening, we should cease to take this phase of the world's activity so much for granted. Familiarity has bred contempt in the thoughtless.

II

In primitive life, each tribe was self-sufficing. There was a division of labor as between males and females, but food, weapons, tents, and clothing were supplied without recourse to outsiders. Then began a period of exchange by barter, during which commerce had no prospect of much progress. There is the familiar story of the hungry hatter who came near starving because the baker and the butcher wanted shoes, not headgear. As a process developed of moving commodities on the backs of slaves or beasts from place to place, bazaars sprang up around the Mediterranean Sea, in western Europe and northern Africa. Some were in the open, some roofed over. Aleppo had forty of them. In Adrianople there was a bazaar of brick, eighteen hundred feet long by five hundred wide. The oldest bazaar in Constantinople, Bezestan, was founded in 1461. They dealt in staples, foods, furs, silks, beads and shells, implements and weapons. But conquest still remained a primary means of getting what a nation wanted. Tacitus said that the Germans had "no desire to acquire through the sweat of their brow what they could acquire through blood." Piracy was a profitable occupation, even for some of our New England ancestors.

Do not suppose that the adventurous Columbus crossed the Atlantic in 1492 through a thirst for knowledge; he was looking for a new trade route. Do not suppose that the East India Company established posts in India in 1496 for anything but commerce, laying thus the foundation for a new imperial dependency of Great Britain. China was opened in 1516, and Magellan in 1519-22 preceded Dr. Eckener of the *Graf Zeppelin* around the world, for commercial motives. This country was colonized by chartered commercial corporations. But it was not until steam power was applied to manufacture that commerce stepped out in seven-league boots. The whole trade of the world in 1820 amounted to but a billion and one-half dollars; in 1920 it was forty-five billions. In a single century it multiplied thirty times as much as in thirty-five centuries preceding. Yet during those earlier millennia the Mohammedans had taught the Christian world a great deal about trading, the Crusades had reopened abandoned trade routes, and Aristotle had pondered some problems that seem to us strictly modern. "It is necessary," he said, "that the citizens should import from abroad what is not found in their own country, and that they should export what they have in excess; for a city ought to be a market, not indeed for others, but for herself. Those who make themselves a market for the world do so only for revenue, and if a State ought not to desire a profit of this kind it ought not to have such an emporium."

The emporiums Aristotle had in mind were bazaars. Contrast them with our mail-order houses, department stores, chain shops and automatic vending machines. Four great inventions at the beginning of the European Renaissance did much to create the modern world: paper and printing paved the way for the Reformation and popular education; gunpowder did more than Cervantes to destroy the feudal system; the compass guided Columbus and extended the field of the historian to the whole world. All were derived from the Chinese, and it took a thousand years for printing to make its way along the silk route. The art reached Loulan about 200 A.D., Niya about 300, Samarkand in 751, Baghdad about 793, Egypt about 900, Fez in Morocco about 1100, Xativa in 1150, Hirault the same year, Cologne in 1320, Nuremberg in 1391, England not until 1494. Imperial Rome demanded silk, which Virgil thought was combed from trees; and that commercial demand in time revolutionized commerce. Fancy trying to do modern business without paper, printing or the compass.

III

Fancy, also, the difference in cost between moving commodities by camel caravan across the plateaus and deserts of Asia and the modern cost of distribution. About forty-nine cents of the dollar you pay for commodities nowadays goes into that web of services called distribution.

One outstanding merit of the machine, as most of us see it, is that it cheapens commodities for the consumer. It does cheapen the cost of production, by multiplying the output of the individual worker and by substituting steam and electricity for elbow grease. But American business genius, which has astounded the world by its methods of mass production, has given all too little time to mass distribution. The outcry against profiteering, which we heard so generally after the World War and still hear once in every so often, arises from the sum we must pay to have things put within our reach and sold to us. A dealer in electrical goods, for instance, has tabulated calls during a single year of 783 traveling salesmen eager for the $35,000 of orders he had to dispense; yet he placed his orders mostly by mail with established houses. These were high-priced salesmen, for the most part, and the consumer ultimately had to pay their salaries as well as their traveling expenses. The manager of a small department store reports that about sixty salesmen call on him every week, and get not more than ten per cent. of his business, the rest of which he places by mail. His shop is a member of a group that has purchasing headquarters in New York City, and he gets four-fifths of his stock from that source. . . . Here is one point of leakage in the distribution system. The employer justifies the salesman's existence on the ground that, even if he does not take actual orders, he acquaints the retailer with his stock and samples, thus paving the way to future orders by mail or otherwise.

Actually there is no profiteering, by and large, either by the manufacturer, the middleman (jobber), or the retailer. All have their economic justification. The up-State New York farmer whose apples are rotting on the ground, and who must pay thirty-five cents for a baked apple in a New York City hotel, thinks he is being bilked. He forgets that the hotel probably serves an apple grown on the West Coast, ices it and the cream which goes with it, and pays a high overhead which includes sky-scraping rentals. And the Long Island truck gardener who gets only two cents for eight dwarf cucumbers can't understand why we must pay twenty-five cents for those cucumbers in a bottle of sweet pickles. Let us see what the machine has done to that package.

There is a label on the bottle, lithographed by machinery; there is the glass bottle, blown by high-priced labor in a mill, and a top lined with cork brought by machinery from the Orient; there is a wooden box containing two dozen such bottles, and the box was made mostly by machinery; the pine which went into it was cut in northern forests, probably by machinery, and moved by machinery to the pickle factory; there were costs of transportation and of insurance and of rent for warehouses; and the bottle contains, in addition to the dwarf cucumbers, red pepper, cinnamon bark and other spices garnered in tropic lands, perhaps

Madagascar or Ceylon or Java; there is sugar from Louisiana or the Philippines or Cuba; there is the cost to the retailer of keeping that bottle on his shelves until his whimsical customer called for just that brand. Perhaps she called for it because she had seen it advertised, and the customer had to help pay for that advertisement.

The customer paid, that is to say, not only for the labor and cash needed to bring cucumbers and spices out of the ground, but for a whole network of expenses which the machine, drawing the ends of the earth together in its steel fingers, has made inevitable. Our grandfathers ate apples grown in their own orchards and cucumber pickles grown in their own gardens or near by, and cooked in their own kitchens. They slaughtered their own meat, instead of eating steaks and chops and roasts killed in Kansas City or Chicago. But they were not so arrogant in demanding that they have a certain brand of pickles, and none other; they did not insist that the meat be aged in cold storage; they did not expect delivery by motor truck. And they did not expect baked apples out of season.

We the customers must accept our share of the blame for the high cost of mechanical distribution.

IV

Of the forty-odd million persons engaged in "gainful occupations" in the United States, twelve millions are busy with farming, forestry and mining, thirteen millions in manufacturing, more than ten millions in moving goods to you and selling them to you, and a few millions in professional tasks, such as medicine, law, education and the church; nor does this take any account of bootleggers, apartment house flunkeys, waiters in restaurants, workers in barber shops and beauty shops. We expect a lot of service, and we pay for it. As for commodities, we spend more than thirty billion dollars a year for them in this country, and more than fifteen billions of that goes into a semi-intangible distribution.

In three ways we are meeting and reducing the cost of distribution in this Machine Age. None of the three would be practicable without the machine. One is the department store, which houses under a single roof a bewildering assortment of goods, calculated to make the visitor to any old bazaar gasp with amazement, were he alive to-day; and these goods are priced, often, so close to the cost of production that we have begun to talk of a profitless prosperity. Another is the mail-order house, with as glittering an array of commodities, and without the traveling expenses of salesmen. A traveler in the mountainous district of North Carolina noted that the natives spoke reverentially of "The Book." He supposed that of course they meant the Bible, for the word Bible means book. But no, he found that they were speaking in those hushed tones of a Sears, Roebuck catalogue; and he awoke suddenly to the meaning of a mail-order house in that area, isolated from railroads and newspapers. The third and most significant factor, however, is the chain-store system; and it has grown at such a prodigious rate during the Twentieth Century as to cause department stores to ape its methods, mail order houses to establish retail outlets, and independent dealers to look sharply for a livelihood.

Of all the chain systems the five- and ten-cent stores are the most fascinating. In one of them I have bought for a dime each ash-trays that sold, in a swagger novelty shop across the street, at the rate of six for five dollars. Here you will find imported china and crockery, textiles and jewelry; the ends of the earth are pulled together even as in that bottle of sweet pickles. Sometimes the entire output of a factory in this country or abroad is purchased over a long period. The ten-cent store seems to me an epic of romance, as the Woolworth Building, fabricated of dimes, seems to me an epic of beauty. Once I was sent to Albany to talk to "Al" Smith, then Governor. On my return my general manager inquired whether I had a good trip. Sure, I replied with enthusiasm; and explained that Albany had one of the best ten-cent stores I had ever seen. My bag was cluttered with purchases there.

The chain shop has revolutionized American retailing, and is causing upheavals in other countries, notably Canada and England. Nor is it confined to the five- and ten-cent variety. Mail-order houses have entered the field, one with one hundred and seventy shops for some of its ten million customers, another with plans for fifteen hundred, about one-tenth of which have already been opened. The Great Atlantic and Pacific Tea Company has seventeen thousand shops, and does an annual gross business bigger than the Pennsylvania Railroad, our premier transportation system. In all there are about one hundred thousand chain stores in the United States as this is written, and the number is growing at the cost of independent shops.

With a million and a half retail establishments, about one to fifty customers, or to twenty-four workers, we are perhaps overblessed with places to purchase. The department stores, with a total of a billion and a half dollars of annual trade in manufactured commodities, number roughly twenty-seven hundred, and have one-sixth of the business; mail-order houses, numbering twelve hundred, do about an equal volume of trade; the chain stores grew from four per cent. of the total in 1921 to sixteen per cent. in 1929. In fifty main lines, with one and one-half million employees, these three standing armies do about one-third of the nation's business. The balance is in the hands of independents.

V

There is and will continue to be a place for the independent retailer, although his number may grow smaller. Many persons want and are willing to pay for a greater variety of stock from which to select. The average life of the independent shop has shrunk in a decade from seven to five years, owing to chain competition, but this does not mean mortality for the practices they have made popular. They must meet economies, in the chain systems, of standardization, self-service by the customer, savings in huge purchases of stock, and vertical or semi-vertical production. One chain owns a can factory and eleven bakeries. Several produce in part, from the ground to the counter, the commodities they retail. Twenty of the largest, with an aggregate capitalization exceeding a billion dollars, have an annual turnover reaching an even higher figure than that, and pay $80,000,000 a year on their common stock alone. There are candy chains, restaurant, grocery and clothing chains, newspaper, theater and radio broadcasting chains, even a chain of shops to sell nuts, and chains of gasoline filling-stations. From a modest beginning in 1879 the system has grown prodigiously with the growth of the machine; and it is the most hopeful sign on our horizon of reduction in the cost of distribution. If branches may be regarded as chains, banks and motor manufacturers have joined the procession; the National City Bank of New York has 106 branches in 23 other countries, the General Motors Corporation as many branches in 104 countries, and our movies are peddled around the world. In this country many banks maintain their domestic branch systems.

VI

The general trend is toward chains and groups of stores having a central purchasing agency and a single merchandising control. Huge mergers of food concerns and chemical companies show the drift. But still further economies are being effected through the utilization of automatic vending machines. The devices by which we obtain chewing gum and candies and paper drinking cups, or learn our weight, are familiar enough; but one large department store is experimenting with rows of machines in its lobby, to sell, without the wages of salesgirls or salesmen, standardized cosmetics, drug and tobacco products. A clerk fills them from a magazine extending into the basement. Foods, notions and similar commodities in common demand may be added to the list as time goes on. Not only is there a saving of money to the shop and to the customer; there is greater convenience for the customer through these machines. It is estimated that in 1928 merchandise retailing at more than $25,000,000 was sold by robot clerks. An increase by at least one-half was expected during the next year. A deterrent in some instances, however, is the cost of the machines, which sell for from $20 to $100. To vend one product a single order was placed for $1,250,000 worth of them. Yet one company handled in a single year 3,000,000,000 pennies from its machines.

Electric washing machines are now fitted with coin devices, so that for twenty-five cents the housewife can get laundry work done automatically for thirty-five minutes. Cigarettes and toothbrushes—each with its tiny tube of paste—are now distributed in that fashion. Uncle Sam has been experimenting with automatic stamp-selling robots. Where there is uniformity of a well-known product the robot does about as well as the human being, and even on occasions says "Thank you!" to a customer.

Clerical fallibility is being offset by machinery, with cash registers and billing machines. The register assures correct change for the purchaser, credits payments on account, makes accurate statements of bills, and gives proof of sale when goods are returned. Even a clear-headed clerk could do no better, and few could do so well. These machines can even make a record showing whether a transaction is in cash, on part payment or for a charge account. They can issue receipts, charge slips, paid-out vouchers and received-on-account records. And billing machines may automatically write headings, addresses, and descriptions, handle fractions of price or quantity, print dollars under dollars and pennies under cents, correct an item where the operator has erred, and compute by multiplication rather than by the slow process of repeated additions; they may automatically total discounts where they are being allowed, and subtract freight or other charges. These are robot mathematicians.

Farmers are learning lessons in distribution while the merchants wrestle with the problem. The farmer does it by joining a coöperative, which prevents him from overproducing and from dumping his product on an overloaded market. We have a fifty-million-dollar coöperative of fruit and vegetable associations, a national association of wool growers, and separate associations to deal in tobacco, cotton, and rice. The big business practices of the Machine Age are being extended rapidly to the most individualistic element in our productive life, and the result will be to introduce orderly methods, stabilize supplies, and eliminate waste motion.

VII

While farmers are learning the A B C of merchandizing, the art has been carried so far by super-salesmen and adroit advertisers that a comparatively new form of credit has been invented. It is open even to the poor man who could get no credit, or very little, a decade ago. Not only is it open to him; it is thrust upon him. The installment plan of payments has piled three billions of debt upon this country's shoulders, and many a worker has mortgaged his wages for a long while to come. Commodities have been consumed which are not yet fully paid for. One may buy, furnish and equip a home on "time." Not only the house and lot but the phonograph or piano, the furniture and rugs and curtains, the radio, electric refrigerator and vacuum cleaner, the automobile and clothing for the family, can be got on credit.

It is estimated that nine-tenths of the low-priced automobiles sold in the United States, and half the high-priced, are placed on the installment plan. One corporation which did a business of this sort aggregating twenty millions in 1920 did five times as much in 1925. Such has been the giant growth of this form of credit since the World War, and it is a direct result of mass production, which has forced the manufacturer and jobber to amplify their outlets through an increased national purchasing power, whether that power is to prove in the long run valid or fictional. It is true that the real estate mortgage was a form of installment buying, and that piano dealers were early in the field. But it is only of recent years that the practice has assumed such proportions as to set the economist to pondering.

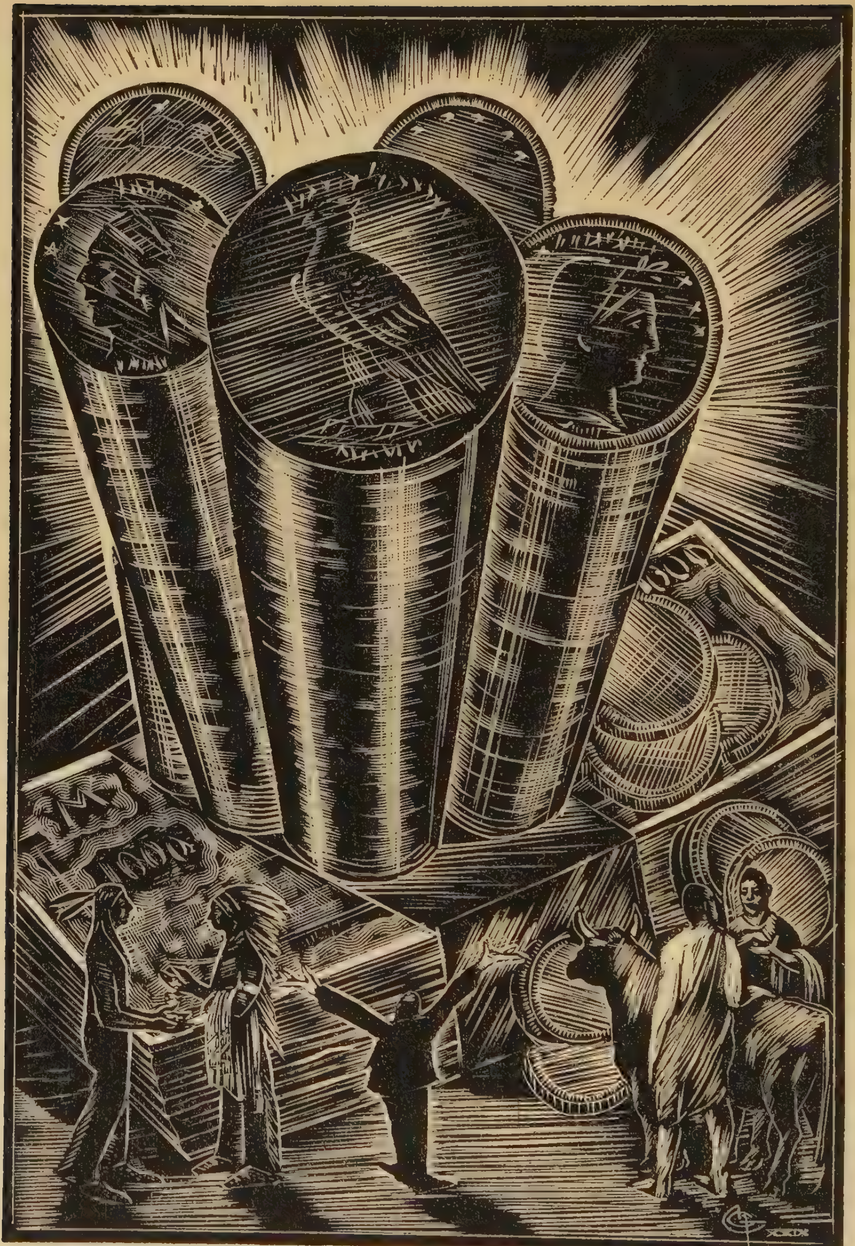
A fair is held semi-annually at Leipzig which dates back to 1015, prior to the Crusades, and at a single session it has done business aggregating half a billion dollars. Textiles are sent thither from Milan, the Netherlands, France, and England; fish from Lubeck; furs, leather and agricultural products from Russia; toys, porcelain, musical instruments, dolls and glassware from all parts of the world. From this spot went forth in 1820 the progenitor of the modern traveling salesman, but in those days he was called a sample rider, because he went to other cities in distant provinces to sell goods from the warehouses in Leipzig. The innovation brought a storm of criticism at first, on the theory that it hurt the business of the fair itself. Fancy trying to do business nowadays without peripatetic salesmen, or solely through congregations at a famous center of merchandizing.

VIII

It is not enough nowadays to invite the customer into a shop to buy. The service of putting at his disposal precisely the commodity and the brand he desires is all too little. Service has made way for a sort of super-service, which causes railroad dining cars to serve free mints, and the roads themselves or the Pullman Company to have in readiness manicures and stenographers, valets, barbers, radios, telephones, shower baths and libraries with good books and the latest magazines. Hotels will find for you a friend not listed in the telephone directory, and a Boston department store has a "promise department," where anything under the sun may be ordered, with the promise that it will be delivered if procurable. Some department stores provide parking space for customers in automobiles, and will even supply chauffeurs if they are wanted. Banks will store your wife's furs as well as your money; they will order theater tickets or railway and steamship transportation; they will even plan a trip for you if you are a depositor, and recommend to you impartially a church or a cabaret. Some will tell you how to draw your will, and save you a lawyer's fee. Some will budget your income, pay your household bills, or collect money for charity. Some maintain information bureaus to answer even the most fantastic questions. They establish Christmas and vacation funds. And the distributors of automobiles, fountain pens, electric batteries, whatnot, agree to keep them in good order over a certain period. It is more than a fetish, this thing of super-service in the Machine Age; it is a kind of religion.

Observing a one-armed man, a small boy once asked his mother what had become of the other arm. He was told that probably it had been cut off. "Well," said the youngster, "seems to me if God made us He ought to keep us in repair." He knew that even the man who sold his Dad an automobile did that.

Super-service, obviously, is part of the cost of distribution in modern commerce. Somebody has got to pay for it, and that somebody is Mr. Ultimate Consumer. When it is deflated from a religious impulse to a business basis, part of the spread between producer and retailer will shrink. When the science that has been applied to production is applied to merchandizing, the beneficences of the system will become more real and more apparent. Nor is that time far distant, for American business brains have turned at last toward a solution of the issue.


XXIX

CHAPTER TWELVE

MONEY: From Wampum to the Bill of Exchange

I

THIS vast commercial expansion which has followed the production of commodities through automatic means could not have been achieved if man had not learned, long before, to exchange goods through the medium of minted and then printed tokens. Modern financial machinery, indeed, is almost as intricate and delicate, beneficial and sometimes perilous, as the metal machinery operated by steam, gas and electricity. It was approached by five slow stages: a self-sufficient tribal economy, barter of things for things, trading with "natural" money (such as oxen, wampum and cowry shells), trading with coined metals, and trading with token money, such as paper bills and bills of exchange.

In the Iliad the first prize for wrestlers was valued at twelve oxen, whereas a woman trained in domestic duties was valued at but four. Draco imposed his fines in terms of oxen, and Solon was hard put to it to translate them into sesterces. The Indian word rupee is from the Sanskrit for cattle, and our words pecuniary and impecunious come from the Latin *pecus*, ox. Aristotle observed: "When the inhabitants of one country became more dependent on those of another, and they imported what they needed, and exported the surplus, money necessarily came into use. For the various necessities of life are not easily carried about, and hence men agreed to employ in their dealings with each other something that was intrinsically useful and easily applicable to the purposes of life." He had in mind the precious metals. But Carlyle, in *Sartor Resartus*, went a step further. He puts into the mouth of Herr Teufelsdröckh these words:

> A simple invention it was in the old-world Grazier—sick of lugging his slow ox about the country until he got it bartered for corn or oil—to take a piece of Leather, and thereon scratch or stamp the mere Figure of an Ox (or *Pecus*); put it in his pocket and call it *Pecunia,* Money. Yet hereby did barter grow sale, the Leather Money is now Golden and Paper, and all miracles have been out-miracled; for there are Rothschilds and English National Debts; and who has sixpence is sovereign (to the length of sixpence) over all men; commands Cooks to feed him, Philosophers to teach him, Kings to mount guard over him—to the length of sixpence.

As Hartley Withers has pointed out, the ox was unsuited to use as a basis of currency. It deteriorated, and it died, it was not easily portable, and it varied vastly from its fellow in size, age and value. Token money such as Carlyle described could have passed only in a community highly advanced economically. But coins of copper, silver and gold were acceptable even to peoples who had never seen them before; and in time the utility and beauty of gold, its malleability and its durability, made it the world standard. Promises to pay in gold are now acceptable throughout the civilized world and in most of the uncivilized areas. The employment of these paper bills, or promises, immensely speeds up the processes of manufacture and commerce.

II

In a nation's coins may be read, as often as not, the history of its gods, its heroes, and its achievements. Greek and Roman specie bears the likenesses of patron deities, Venus, Pegasus and the nymph Arethusa. When Alexander the Great was made a god after his death the profile of his head was stamped on tokens, and thereafter Roman Emperors began having themselves deified during their lifetime, so as to enjoy the distinction in the flesh. But they had been preceded in that field by Sappho and the Ptolomies, nor could they bar Cicero, a mere orator. In the western world coins were not known until 700 B.C., but we read in the Bible that Abraham bought a field for four hundred shekels of silver, "current money with the merchant." Crœsus, King of Lydia, was the first so far as we know to insist that coins should be pure gold and silver. Perhaps this explains his reputation for riches. Henry VIII of England, upon whom Francis Hackett has thrown a contemporary spotlight, was not so scrupulous as Crœsus. Henry was known as "Old Copper Nose" because he debased the groats which bore his image. In the days of the American colonies coins were so scarce that tobacco and wampum, the latter made from the stems of periwinkle shells, served as media of exchange. Our own economic experience, indeed, affords a sort of outline of history in that field, fallacies and all.

Massachusetts, being even then money-minded and later a leader in the profitable slave trade, set up the first mint in this country and turned out pine-tree shillings. Not long thereafter colonial governments and individuals alike issued paper money, subject in many cases to violent depreciation. As for the precious metals, they were not so plentiful then as now, but there were firms and individuals which established reputations for honesty in coining them. The pound sterling is supposed to have derived its name from a group of Scandinavian merchants of great probity, known as the Easterlings. They coined silver, and did not "sweat" nor clip nor debase it. In their day gold was hard to get. Even until 1850 the production averaged less than ten million dollars' worth a year; in 1915 it was four hundred and sixty-nine millions. In less than half a century before 1915 twice as much gold flooded our money markets as during four centuries preceding. And the Forty-niners who participated in the famous "rush"—by ox-cart—to California, betrayed the human weakness for this metal. They underwent such sufferings and privations that many of them perished, and they engendered a rude civilization which is now part of American folklore. To a shallow depression just across the Nevada line they gave the sinister name of Death Valley. Once I took part in a collegiate debate as to whether gold or women had exercised the greater influence on the life of mankind, and the women lost.

Yet when the Forty-niners were gambling, lynching and enjoying their gunplay the industrial revolution was already more than half a century under way. Our modern system of exchange, founded primarily upon faith, with credit, as the elder Morgan said, based upon character, could have been constructed without the machine, but undoubtedly the machine called it into being and facilitated its spread throughout the globe. We could even have our stock exchanges without mechanical accessories, although of course we would have to get along without the ticker tape, and the ten million persons who have participated in the recent Wall Street boom would have been barred from it. But we could not, without the machine, do business with South America or Asia on the basis of thirty-day commercial paper or bills of exchange; the transactions would require for their completion more than thirty days.

III

Time is an important element in a bill of exchange, and as a rule space is an element. In *The Meaning of Money* Hartley Withers tells us that Cervantes drew, in jest on posterity, a bill of exchange which was a fair parody of its modern counterpart. Sancho Panza's ass had been stolen by a rascal whom the chivalrous knight had freed from the grip of the law, and Don Quixote consoled his servant with the promise of three asses from his stable of five. The two were then in the Sierra Morena, so that the factors of time and space were involved. Don Quixote wrote a note to his niece, as follows:

> Dear Niece: At sight of this, my first bill of ass-colts, give orders that three out of the five I left at home in your custody be delivered to Sancho Panza, my squire; which three colts I order to be delivered and paid for the like number received of him here in tale; and this, with his acquittance, shall be your discharge. Done in the heart of the Sierra Morena, the twenty-second day of August, this present year. . . .

"It is mighty well," said Sancho, "now you have only to sign it."

"It wants no signing," Don Quixote retorted; "I need only put my cipher to it, which is the same thing, and is sufficient, not only for three, but for three hundred asses." The document was therefore irregular. Nowadays international covenants and treaties are the only important papers which are merely initialed. But after three centuries American business men knew less, as a class, about the bill of exchange than Cervantes knew. Until the passage of the Federal Reserve Act in 1914 our bankers were mostly note-shavers, and few of them had a just conception even of commercial papers. The debate over the Federal Reserve, which, out of deference to Jacksonian Democracy (there being a Democratic administration in 1914), established twelve central banks instead of one, was widely enlightening; and the passage of the act not only saved this country's bacon during and after the World War but put it on a financial basis adequate to the expansion of mass production thereafter.

IV

Nowadays we do a vast volume of trading merely on telegraphic or telephonic orders, without so much as autographed initials; and in the United States we accomplish nine-tenths of our business by the use of checks, which economists call "deposit currency," and which are merely orders on a bank to pay a stipulated amount. An inverted pyramid of credit and currency is thus erected on a comparatively slender foundation of gold. But whosoever wants gold can always get it.

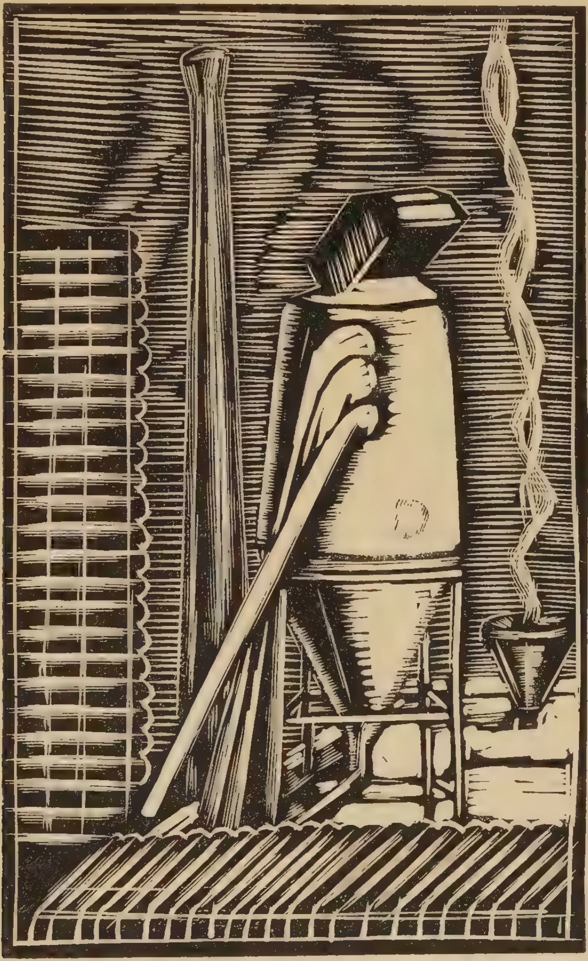
Gold is wealth, but it is not capital, for capital consists in tools and the machinery of production. Barbers are capitalists because they own their tools, but not many others are. The hundreds of thousands who work for Henry Ford are not capitalists, for example. And it is quite common among those who call such workers "wage slaves" to complain bitterly about the unequal distribution of financial resources in the United States. There is inequality, but sometimes the figures cited are seriously in error. Two-thirds of our wealth, it is asserted, is in the hands of one-fiftieth of the population. Senators La Follette and Brookhart and their fellows are fond of dwelling on such figures. Senator Frear of Wisconsin once declared on the floor that unlimited profiteering had brought about a condition in which 2 per cent. of the American public owned 65 per cent. of all the wealth, while millions were scraping out a bare existence.

Now, that statement was based on what seemed to be good authority. Census figures, for one thing, are often most misleading in this field. The Commission on Industrial Relations, of which Frank P. Walsh was chairman (Mr. Walsh is a lawyer, not an economist or a financier), published a report in 1915 which is still meat for the malcontents, and in it declared that "the 'rich,' 2 per cent. of the people, owned 60 per cent. of the wealth." They got the notion from a book by Willford I. King, one of the experts on President Hoover's National Bureau of Economic Research, which has made a survey of recent economic changes. But Mr. King made the estimate during the World War, from insufficient data. As a fact there are two ways of computing national income, one on the basis of production, the other on the basis of income. We can't compute income accurately from Secretary Mellon's report on income taxes because huge sums are invested in tax-exempt securities. Walter Renton Ingalls, now recognized as the best authority on such matters, says that three-fourths of the national income goes to wage-earners, and that about 30 per cent. of the national wealth is in the hands of the rich and the well-to-do. By the well-to-do he means those who pay taxes on incomes of $3,000 a year or more. He once gave me an estimate of the national wealth, internal and physical, at the end of 1920, in the following table:

OWNED BY THE PEOPLE GENERALLY

Real estate	$15,000,000,000
Highways	750,000,000
Canals	1,000,000,000
Irrigation enterprises	375,000,000
Total	$17,125,000,000

The public owns, in addition, large proportions of the gold and silver, wharves and drydocks, while among private owners are widely distributed the lands and dwellings, automobiles, furniture, clothing and jewels.



Owned by the Farmers

Lands	$54,903,586,200
Buildings	11,287,500,000
Implements	1,773,750,000
Live stock	7,070,189,000
Total	$75,035,025,200

Farmers also own a large percentage of the automobiles. Their property, however, is estimated to be mortgaged for about four billions. They improved their position during the war, but failed to preserve their gains.

OWNED BY CORPORATIONS AND BUSINESS INTERESTS

Mines	$ 3,269,000,000
Railways, steam	25,500,000,000
Railways, electric	4,000,000,000
Express companies	34,691,199
Manufacturing machinery and tools	15,500,000,000
Meat-packing plants	350,000,000
Telephones and telegraphs	1,800,000,000
Pullman cars	150,000,000
Tank cars	180,000,000
Petroleum pipe lines	608,000,000
Petroleum tankage	60,000,000
Light and power plants	4,058,000,000
Gas-lighting plants	1,500,000,000
Waterworks, privately owned	310,000,000
Total	$57,319,691,199

Not only is the total wealth of this country greater than that of any other nation, says Mr. Ingalls, but also the wealth per person is greater, and without any doubt its division among the people is more widely spread.

"Contrary to the popular belief," he adds, "the fact is that the business interests of the country paid mainly for the war. The farmers improved their position, as did the small investors, who comprise farmers, the small merchants and the more thrifty among the wage-earners. The real financial tragedy was in Wall Street."

V

Let us consider more recent figures, as they come from Joseph S. McCoy, actuary of the Treasury Department at Washington. The preliminary report of the statistics of income for the calendar year 1927 was not returned until November, 1928, and is the latest available as this is written. Although the number paying income taxes shrank from more than four millions in 1924 to less than two and one-half millions in 1927, those who paid on incomes in excess of $5,000 reported an aggregate income in the earlier year of a little more than nine and one-half billions, whereas in 1927 the aggregate income for this class was more than thirteen and one-half billions. The total revenue for the earlier year, with many more taxpayers, was about $137,000,000 less than in 1927. The decrease in the number paying taxes, of course, was due to increased exemptions.

During these three years, Mr. McCoy reports, three thousand new millionaires made their appearance, and the average individual income gained nearly 60 per cent. The number having incomes of more than $1,000,000 almost tripled. The number having incomes of $5,000,000 or more jumped from three to ten. (These are the kind of incomes which endow our great philanthropic and research foundations.) In 1924 the average income from wages and salaries was $1,886, in 1927 $2,437.

Mr. McCoy also made up a little table, showing the division of incomes higher than $100,000 a year, as follows:

Wages and salaries	$262,030,802
Fiduciary	39,783,860
Business	65,285,511
Partnership	275,412,988
Profit from sales:	
Not capital gains	279,337,365
Capital net gains	865,455,798
Rents and royalties	49,739,167
Interest and investments	172,150,197
Interest on taxable United States obligations	10,325,860
Dividends	1,185,943,926
Total net income	$3,205,465,474

The total wealth of these 11,067 individuals may be estimated at somewhat over $50,000,000,000. Of this, it is probable that the ten wealthiest own something over $4,000,000,000.

For 1928 the statistics are quite certain to be larger, owing to the gains registered by all classes in the stock markets. During the prolonged upward swing of security prices even the lowly, who could scrape together but a few hundred dollars, became investors and speculators. Clerks in chain shops knew the day's cost of call money and the position of General Motors, steel, American Can and other market leaders. It was the biggest boom in history, and the New York Stock Exchange sometimes did a business of three hundred billion dollars in a single day. Ten years before a turnover of two million shares in a session was enough to guarantee a first-page newspaper story; five and six million share days now became frequent.

Stock Exchange seats, which had sold during 1928 at less than $300,000, sold as high during the year as $575,000. At that rate the eleven hundred memberships were worth about two-thirds of a billion dollars. During the one month of November the sales aggregated more than a hundred million shares, the highest in the exchange's history, establishing an average daily turnover of five millions. In a single day's trading eight hundred and eighteen separate issues figured. Brokers' loans on "call" passed the five billion mark; and the market price of representative issues doubled in some instances, even tripled in others. A new ticker was put in when the old one began lagging too far behind the procession of prices, and it was reputed to be able to report seven million shares in the five-hour day. Obstacles thrown in the market's way by outside influences, notably the Federal Reserve Board, could check its upward march only temporarily if at all. In ten weeks during the Spring of that year fifty stocks rose more than twenty points in the aggregate, on sales of nearly two hundred thousand shares. In the late Fall came a crash and disaster.

VI

Back in 1790 a dozen men gathered beneath a buttonwood tree on Wall Street to trade in United States bonds, of which Congress had just authorized an eighty-million-dollar issue, and in the stocks of three banks, recently organized. They were our first stock-brokers, and they foreshadowed the present Stock Exchange. Two years later twenty-four men adopted certain rules to govern trading in stocks, and after the war of 1812, during the rapid industrial and commercial development which followed the second war with Great Britain, rooms were engaged at 40 Wall Street. At last we had an indoor market.

Then, after the Civil War, came the application of steam to industry on a larger scale, and the building of railroads to the West. Fresh batches of securities found their way to Wall Street, then the only open market in this country; mostly they were government bonds and the securities of industries and railroads. Gas and electric corporations were represented before long, then the telephone, then motors, aviation and radio. Almost until the outbreak of the World War, however, the public as a whole kept its skirts clear of the market. William Jennings Bryan was calling it "the enemy country," and his cross-of-gold speech at the Chicago Democratic convention of 1896 lingered in the people's memory. The Stock Exchange was regarded as a slaughter house for lambs. Then, when the public had learned to buy bonds of the governmental "Liberty" issues, and to buy "war bride" stocks, the temper toward the market swung perceptibly to the other side. It was perceived that this gigantic trading post provided an elaborate machinery for handling a necessary trading, and for informing the public about its transactions. The commissions of brokers, it was perceived, were not extortionate, nor did many brokers trade for themselves on the floor. The visitors' gallery was crowded daily with tourists and buyers from out of town, who had come—since they were investors or speculators on a small scale themselves, in many instances—to feel a personal interest in what was going on and how it was done.

With the unexampled prosperity thus reflected in the stock markets, after the post-bellum panic, the United States found herself an international creditor on a sumptuous scale. The American dollar was a pulmotor of Europe's economic revival. Two and one-half billions of them were poured into enterprises, such as railways, factories, public utilities, steamships, chain stores in England and mines in Poland; four billions went into private loans to corporations and municipalities—with ten billions more loaned in other parts of the world.

Even before the World War some of our largest corporations had branches in Europe. The Singer Sewing Machine was represented at Glasgow and in Wittenberg, Germany; the International Harvester had plants in five European countries; the American Radiator, the Worthington Pump and Machinery, the Western Electric and the General Electric all had spread out across the Atlantic. But these were strictly industrial operations. After the war the movement assumed a more strictly financial aspect. Nor is it without its disquieting implications.

VII

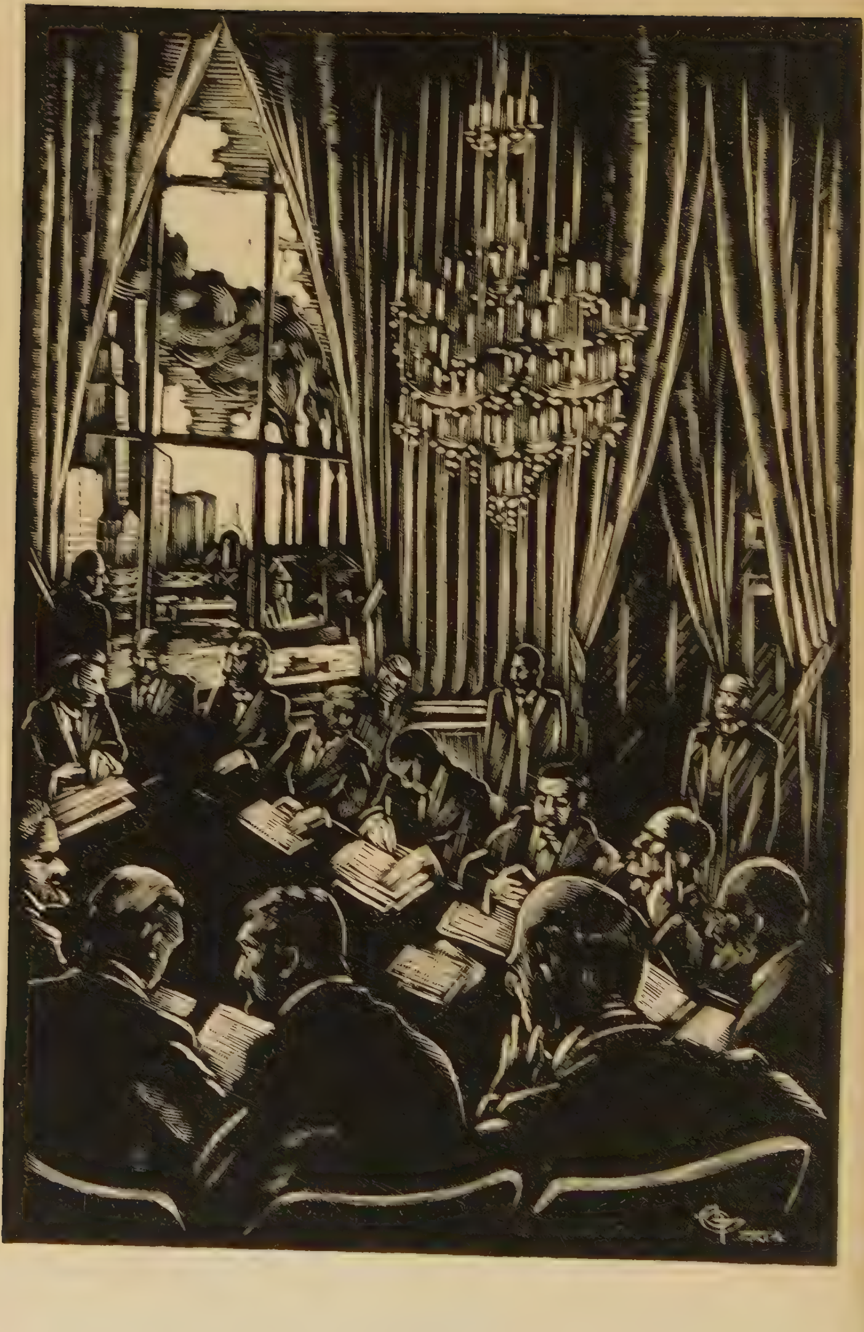
In Europe there is a constant outcry, from certain quarters, against "peaceful penetration," "commercial conquest" and "industrial Americanization." In Asia the complaint is voiced that the civilization thrust upon its peoples, especially upon the Chinese, is inferior to the civilization already rooted there. And in Latin America there is the bitter charge that the Monroe Doctrine, originally political in its purpose, is being employed to mask predatory commercial conquest. Central American nations feel this as strongly as their neighbors to the South; and our policy in dealing with Nicaragua has been severely criticized not only there but in Europe. It is charged that we have dominated that weaker country for revenue only, that Wall Street might reap the greater gains. Let us look for a moment at the facts.

Our interference in Nicaraguan affairs began in 1909, when, during the Taft administration, the weight of our influence was thrown on the side, paradoxically, of revolutionists against the established government. The revolutionists, however, were Conservatives, and with our help they forced President Zelaya to flee the country. Then we hand-picked a president to our liking, and Washington began ruling the country more rigidly than it has ever ruled any State in this Union. Time and again we have decided who shall be President there, and have upheld the decision by the force of armed marines. We have now disarmed nearly all the inhabitants, and have supplied officers for a new army from our marine forces. An American collects Nicaraguan customs, pays part of them on her foreign debt, and supervises governmental expenditures. The last general election was conducted under the supervision of armed American troops, headed by a general who had the status of a dictator. It was the first election ever seen in the country in which there was a free ballot and an honest count.

As for Wall Street, financiers there went into Nicaragua in 1911, not on their own initiative but at the request of our State Department, which was solicitous lest European warships be sent over to collect money owing to nationals abroad. And since there is a plan for a canal across the isthmus, of great importance to American trade and American military strategy, our diplomatists and militarists felt it imperative that alien warships keep their distance.

"However mistaken and blundering and unethical, or however righteous and magnanimous," says Harold Norman Denny in *Dollars for Bullets*, "has been the behavior of the United States in Nicaragua, it can be judged understandingly only in relation to those major considerations which have dictated it." He admits that if Nicaragua were at the other side of the earth the people might misgovern themselves as much as they pleased without any meddling on our part; but since they are under our very noses, so to speak, and since the island's welfare is closely linked with our national policies, interference appears to have been inevitable and to have benefited the country; and Mr. Denny, who has a secure reputation as a liberal, thinks we have been berated unjustly.

The United States has adopted in this instance methods which Great Britain, France, Holland, Germany and Japan have exemplified during the last century, and with much greater greed, in China and other "backward" areas of the world. During the Machine Age this country has become imperialist, but we like to think that we exercise a benevolent imperialism. And certainly the modern methods of commerce and finance carry far less threat of war than the old methods, with their concessions and "sphere of influence." We have moved forward from the age of conquest to the age of coöperation. More and more we are witnessing international partnerships in the development—exploitation, if you will—of fallow areas. Partnerships do away with those frictions and rivalries which breed conflict. In the next chapter we will consider the modern commercial and financial forces that are making for peace.



CHAPTER THIRTEEN

Foreign Affairs: From Conquest to Coöperation

I

In the outworn phraseology of medieval days we still speak of "commercial wars." Germany, England and the United States, we are told, are now engaged in "the war after the war." The thought dates back to the era of trade as a by-product of conquest. John Carter notes, in *Conquest, America's Painless Imperialism*, that in 1926 we sold 65,000 electric fans and 52,000 enameled lavatories to foreign purchasers. "Year by year," he says, "American business is conquering new provinces and organizing their economic life so as to forestall competition and preclude commercial fluctuation." He thinks the American machine has ridden rough-shod over old-world culture.

Perhaps it is not quite so bad as that. Europe in particular, Asia and South America to some extent, may wail that they are being "Americanized," and lament the standardization which machine-made goods carry in their wake. As a fact they are being put into touch with the conveniences which the machine for the first time has made possible, and as a fact this interweaving of commerce through the world has made the world so interdependent, each part upon others, that the dread thought of "the next war" appears to grow daily more illusory.

Time was when social philosophers, somewhat too hastily, forecast universal peace as a consequence of economic mutuality. It may be that their prophecies are nearing fulfillment. Let us take a look at the new world that has come into being since the World War.

Through mechanized commerce we are approaching an economic technique of peace. War is a political act; and although many countries have renounced it as an instrument of national policy, the language of diplomacy, for all its suavity and assurances of distinguished consideration, is saturated with veiled threats. The "Kellogg Pact," originally a French suggestion, has not proved a quite convincing gesture. Warfare remains the act of a government, not of its people. Even in a republic such as ours, the President may take a hostile course without consulting the representatives of the people. Jefferson sent an armed squad into the Mediterranean against Tripoli without Congressional authority. Our war with Mexico is another case in point. "Nobody declared the Mexican War," said Daniel Webster; "Polk made it." Two battles were fought before Congress took action. And in more recent times Roosevelt blockaded the northern coast of Cuba, which was an act of war, three days before Congress recognized a state of war with Spain. The formality of declaring war, indeed, has fallen into desuetude. Congress merely recognizes that a war exists.

Yet all the instances I have mentioned had their economic bases. We have witnessed an outburst of violence in Palestine which was principally religious, but modern wars arise mostly from rivalries and frictions in the international struggle for markets in the so-called "backward" areas of the earth. How futile, then, the theory that peace may be assured solely by political coöperation or arbitration! It is impossible to arbitrate any question about which governments are eager to fight. Spain wished to arbitrate the sinking of the *Maine*. Nor will nations forego the right to defend their soil. Even in highly organized societies, where there is every recourse to law, where courts are respected and their decisions obeyed, we legalize manslaughter in self-defense. No code of laws or of community coöperation yet devised has succeeded in making self-defense unnecessary. No international court nor league can make it unnecessary between governments, although international courts may keep the peace in cases where nations do not consider that their territory, their property, or their honor is imperiled.

II

It is true that the plea of self-defense is often deceptive. Governments justify acts of aggression as defensive, on the same ground that a small boy is counseled to hit the other fellow first. But national defense will continue to be advanced as an excuse for war so long as the provocation, whatever its nature, remains. This is usually the excuse offered by political leaders, to arouse the people to the necessary hysteria, when it is expedient or necessary to lead them into battle. That they are defending their existence as a nation, or their freedom, or their soil; that they are enlisting in a cause which appeals to their emotions of honor, chivalry and glory—these are the war-cries, although the real reasons, in most cases, are greed and aggressiveness, born of the belief that one country or its nationals may profit, in markets, seaports, trade routes, raw materials, or territory, to the detriment of another.

Commerce, which was once an arm of government, now dominates government in its foreign relations. The calendar of every chancellery is crowded with economic issues. Foreign relations are chiefly trade relations. Diplomacy has become the creature of finance, commerce, and industry. When war is declared it is with the consent or at the bidding of these interests.

Undoubtedly business interests as a whole prosper most amid the security and confidence that peace engenders; but it often happens that individual interests or groups, sometimes the most powerful within a country, believe they stand to profit by conflict. The spectacle of the war-bred millionaire is familiar to every one. Governments, too, suffer from the delusion that they may increase their prestige, their power, and the contentment (to say nothing of prosperity) of their peoples at the expense of others. In times of peace bloodless wars between business interests are constantly in progress. We call them trade wars. Frequently the envies and jealousies they arouse result in open rupture, sometimes in armed conflict. Even where commercial intercourse is on the ordinary basis of exchange, these conditions are apparent; but they are most pronounced in "backward" areas, such as Asia, Africa, the Balkans, Latin-America, and Mexico. There political instability leads to the corruption of official life and the establishment of zones or "spheres of influence," wherein the nationals of a single country dominate to the disadvantage of others.

III

That it is possible to avert such frictions, and assuage the resentments they have provoked, by international copartnership in the use of export capital, is indicated in many instances. Three will be cited here. One directly affects the Far East, another Mexico, another Europe. All of them have furthered, in some degree, the peace of the world.

I. China. This case divides itself into two loans, one the outgrowth of the other, in both of which nationals of the same countries are coöperating. The transactions are financial, but have a commercial foundation.

(a) The Hukuang Loan. The influence of this country was interjected in 1910 into a project to build a railroad into Szechuan, an immense inner province of China. Practically the only communication of Szechuan at that time with the outer world was through the dangerous gorges of the Yangtze-kiang. At the instance of our Department of State a group of nationals in the United States undertook to coöperate with groups in Great Britain, France, and Germany in surveying and constructing a railroad into the province. After the outbreak of the World War, Japan supplanted Germany in the enterprise. The bonds issued for the purpose are listed on the stock exchanges of the four countries.

The Hukuang Loan was an effort to reconcile conflicting international claims in the Yangtze Valley, and to check competitive struggle for a sphere of influence there. The struggle was full of danger for China and pregnant with possibilities of war. Had a single group of nationals obtained the railway concession at stake, that nation would almost certainly have established a "sphere," which its government would have been prepared to maintain by diplomatic representations and by force if expedient (excepting the United States, which has not adopted this policy); and in this "sphere" the traders of other countries would have operated, if at all, under provoking disadvantages. Nearly all the wars in the Far East during the last century have sprung from competitive economic conditions such as these.

Coöperation between groups of financiers in the four great nations standing to profit chiefly from the exploitation of China was a guarantee that none would dominate the commercial, industrial, and investment opportunities along the Yangtze and in Szechuan Province; that none would arrogate to itself semi-monopolistic privileges in exploiting the rich industrial and mineral potentialities of these regions; that the business interests of all four countries, on the contrary, would have equal opportunities in trade prospects, in acquiring raw materials, in bidding for the construction of the railway and its maintenance, prior to its taking-over by the Chinese Government. After the survey had been made by an American engineer the project was halted by the World War, and has not been resumed.

(b) The China Consortium. This was originally an American proposal, and was the outgrowth of our experience in the Hukuang Loan project. When put into full effect, the Consortium to finance the industrial development of China, and to stabilize and reorganize her currency system, will necessitate a reëxamination of the whole field of exploitation; will set up a wall against further monopolistic concessions, which encroach on China's territorial and administrative integrity; and may pool the outstanding railroad, commercial, and industrial privileges held by aliens in that country. It will allay, if it does not altogether sweep aside, the conditions which at present are a menace to the peace of the Far East, despite the improvement effected by the Washington Conference treaties. The Consortium was affirmed and endorsed at this conference.

Originally the China Consortium embraced groups from six nations: the United States, Great Britain, France, Japan, Germany and Russia. The World War disqualified, at least temporarily, the German and Russian groups. In 1916 a Democratic Administration in the United States repudiated the arrangement, and the financial group here withdrew; but on further consideration the same Administration gave its full and public approval to the plan, and it was reorganized as a Four-Power Consortium, with thirty-seven banks and banking houses throughout this country participating.

Neither of these two loans has been brought to fruition. But they illustrate the possible effect of international financial coöperation, and their actual service in averting the impulses which lead to war, and so in promoting peace, is already apparent. They have reconciled divergent purposes, plans, and points of view. They have brought better understanding. They have established a basis of common interest between nations that had been carrying chips on their shoulders.

II. The Mexican External Debt. After the overthrow of Porfirio Diaz, Mexico defaulted on the interest and sinking fund of an indebtedness which ran to about half a billion dollars. The bonds were held by investors in the United States, England, France, Germany, Holland, Belgium, and Switzerland. In part they were secured by Mexican customs receipts. During the World War and for several years thereafter the matter remained in abeyance, because the governments whose nationals were chiefly interested were otherwise preoccupied. But the time came when there was danger that any one of them might move for preferential rights, thus arousing the suspicion and hostility of others. There was a remote possibility that one or more of them might seek to foreclose a part of the international mortgage by the display or use of force. In that event marines would have taken charge of Mexican customs until the defaulted interest had been satisfied or an adjustment coerced. This procedure was improbable because a defiance of the Monroe Doctrine would have incurred the displeasure of the United States; but the situation, so long as Mexico's creditors might act independently, was disquieting.

Groups of bankers representing the majority of the Mexican bondholders in six of the seven countries, therefore, formed an international committee to coöperate in readjusting the debt. (Germany, whose nationals are not represented, is expected to join the movement eventually.) A citizen of the United States was authorized to represent the committee in discussing the terms of settlement with the Mexican Government; and the governments of the six countries gave their sanction to the negotiations. An agreement was reached by which the claims were scaled down, and a basis of payment satisfactory to all parties concerned was established, peaceably and on businesslike terms. Subsequently the United States extended recognition to the Mexican Government.

III. The International Loan to Austria. After the World War, Austria, depleted in population, shorn of rich territories and with a currency that had little back of it other than the printing press, rapidly approached bankruptcy and starvation. In this plight she was threatened with revolution and bloodshed among her own people, and was an invitation to aggression by neighboring powers. She was a sore spot in the European economic system, a prime contributor to its chaotic condition, and by these tokens a cause of anxiety to countries that had recently been her enemies.

The circumstances of the $126,000,000 loan, which served as a poultice to this sore spot, do not require extended recapitulation. A committee of the League of Nations devised a plan for the loan, after the Austrian Government had manifested unmistakably its desire to set its financial house in order; and an expert appointed by the League supervised the necessary internal reforms, which were drastic. Commonly this is called a League of Nations Loan, but it was not: the League machinery was merely utilized in initiating it. The machinery of the Hague Tribunal, had it been operative, would have served as well. The loan was guaranteed, not by the League, but by the Governments of Great Britain, France, Italy, Holland, Belgium, Sweden, Denmark and Czecho-Slovakia. About one-fifth of the bonds were sold in this country. They yield 8 per cent., and are an attractive business investment, not a matter of charity to a vanquished foe.

This loan differs from the others cited here in that a group of governments took an active part in it, some by guaranteeing its payment and one at least (Switzerland) by taking a direct share of the bonds. The success of the venture is attested by the improved status of Austria, and by the removal of those conditions which were a cause of apprehension. The conditions could not have been alleviated by a single government nor a single group of nationals. Only through coöperative financial effort could a remedy be found.

One of the examples thus briefly sketched deals with the collection of an international loan; the others with lending operations. Others might be cited, such as the transaction by which the indebtedness of Honduras was scaled down.

IV

The processes of international economic coöperation, however, have already had their beginnings in other fields. A group of Americans, with the approval of our Department of State, has bought an interest in a great oil corporation, already under international ownership. American capital is working with British in the export of tobacco, American with Swedish capital in the

import of safety matches. Our nationals are partners with Belgians in prospecting for diamonds and exploiting mines in Africa. English and Swiss capital are allied in the manufacture of condensed milk, British and Continental in developing Mexican oil properties, French and Italian in making and selling silk, British and Belgian in African concessions. The Suez Canal corporation is a notable instance of international coöperation; and the celebrated Berlin-to-Bagdad Railway, so-called, which was one of the economic factors in the World War, is an international property.

These coöperative commitments are increasing of their own accord. The stocks and shares of nearly all great corporations engaged in overseas trade (with the exception of the Hudson's Bay Company, which operates under an old charter forbidding alien participation) are listed on the stock exchanges of their respective countries, and can be purchased by foreign capital, acting through members of the exchanges. International partnerships in steamship passenger lines and in merchant fleets are already a commonplace, and as they grow will tend to quiet disputes about the freedom of the seas. A coöperative search for raw materials, and coöperative development when they are found, will do much to prevent ill-feeling. Already this country and Great Britain have exchanged notes of some acerbity, despite the suavity of their phrasing, about oil and rubber. As we have seen, the coöperative movement has already manifested itself in oil production. But there is a stronger tendency, it must be admitted, on the part of every great country, to make itself as nearly as possible self-sufficient in the sources of supply of its principal industries. This tendency is due solely to suspicion and fear. It is prompted by the bugaboo of "the next war." In the development of such a precarious raw material as oil, for instance—precarious in the prospecting gamble—business sense would dictate that the risks be shared. The importance of oil in war, not its importance in peace, leads to independent adventures in questing for new concessions, at the constant risk of international friction. In the scramble for other raw materials there is apparent these two forces simultaneously operative: the nationalistic tendency to "go it alone," and the common-sense impulse to share with international partners the risk as well as the profit.

The first tendency would be stimulated, and the second checked, if this country were to enter into commercial covenants with that end in view. As a preliminary to coöperation, it is the part of wisdom to curb the concessionaire through the application of the Open Door policy promulgated by Secretary John Hay. This policy, looking to equal commercial opportunity for all in "backward" countries, is in effect a demand that the most-favored-nation clause be applied impartially. Although the great Powers subscribed year after year to the principle, it remained a diplomatic fiction until the Washington Conference for the Limitation of Armaments. There the Open Door ceased to be a vague phrase, expressive of an aspiration rather than a fact. Its economic and political implications were at last made clear. A nine-power commercial treaty was signed, and has since been affirmed, whereby the term was made explicit at least in its economic aspects. Commercial regulations were laid down which should make it actually operative in the Far East, and binding on the principal nations trading there. Railroad and steamship rebating, special harbor and docking facilities, and similar devices for favoring one set of nationals at the expense of others, are now openly branded as contrary to the Open Door policy.

The Open Door does not provide for coöperation, but puts competition on a fair basis, and to that extent makes it less dangerous. Why should it not be so defined in a series of treaties between this and other countries, making it generally applicable? When observed it puts an end to monopolistic concessions, whereby the nationals of one country arouse the envy and covetousness of others. To that extent it mitigates the impulses to war. No government has denied the fairness of the policy. The principal nations of the world have subscribed to it. Nor can any with good grace deny that, in making it everywhere effective, it should be retroactive: that is, it should be operative in those concessions which have been made the basis of "spheres" and so are a grave menace to peace.

V

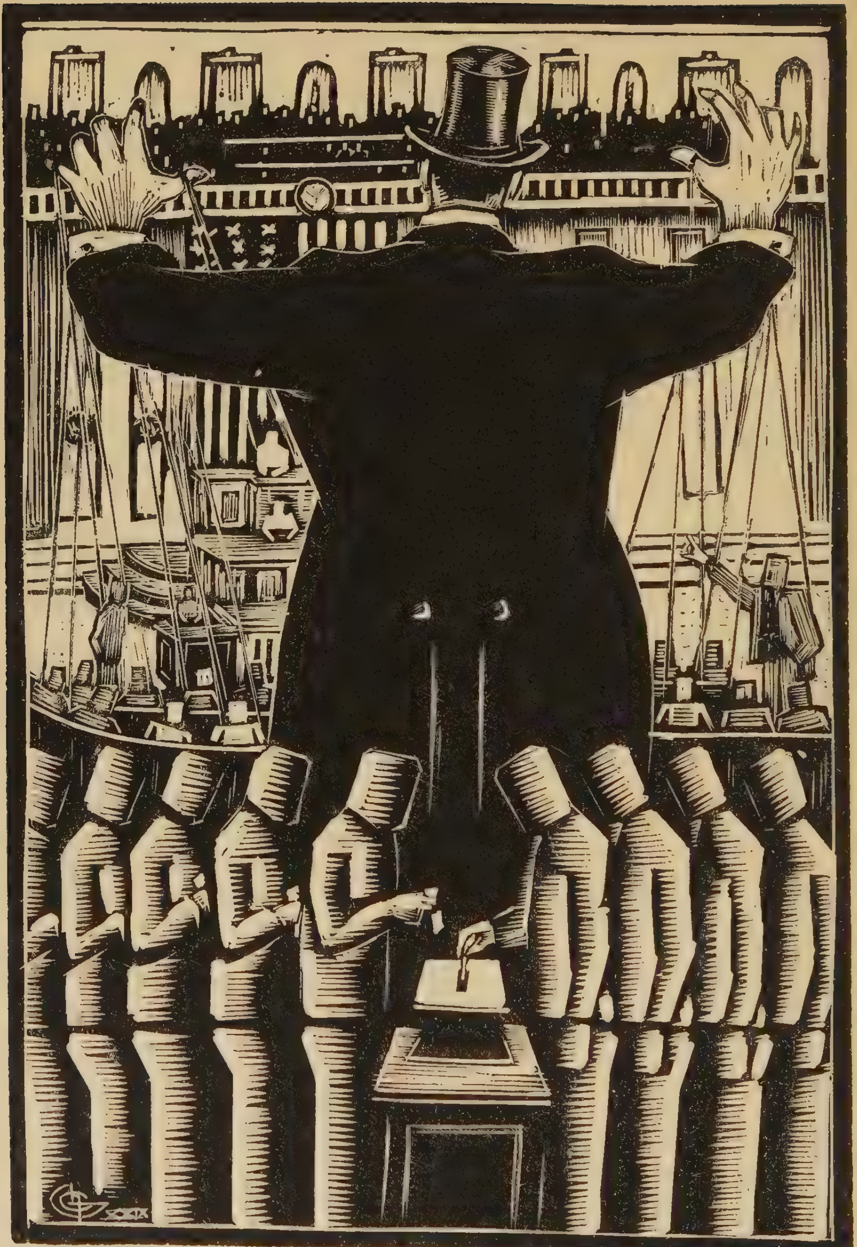
Hand in hand with such covenants might go international agreements to discountenance dangerous competitive enterprise, and to encourage coöperative ventures. Such agreements, however, could not be made retroactive. It is not probable that governments will be ready to surrender legitimate trade advantages already gained by their nationals, in cases where those advantages have been reached without such political aggression as constitutes a threat against the sovereignty of the nation exploited, or against the peace of other nations. It is neither easy nor desirable to stipulate that a firm which has established a branch overseas, for instance, shall admit others to share the profits it has won fairly by its own initiative and risk.

Civilization's growth in the Machine Age registers constantly more cosmos and less chaos, more mutualism and less anarchism. In the survival of the fittest nations, the test of fitness is the social principle. The great industrial and commercial activities of to-day are paving the way for peace; militarism has ceased to be the basis of civilization, for the machine has supplanted it. "All history," said Emerson, "is the decline of war." His saying may be more fully borne out in the years to come. Every enlargement of social and economic interdependence tends to justify it. Great scientific and industrial complexes, H. G. Wells reminds us, "already transcend the boundaries of existing sovereign States and make for a single economic world organization, for Cosmopolis, that is, and not for Empire. . . . To-day the progressive entanglement of the economic and financial affairs of mankind into a world-wide system of reactions is much more impressive than it was in the opening decade of this century. It is going on faster than any of us could possibly have anticipated then."

VI

Hope of world peace clearly lies, not in the outworn phrases of the old régime's diplomacy, not in any other political agency, but in the operations of an enlightened Big Business. It may be objected that this would deliver a large part of the world to capitalistic exploitation. But capital in coöperation is capital with its fangs drawn; and at its worst it cannot be as bad as militaristic exploitation. Each undeveloped area of the earth acts somewhat as a vacuum; it sucks irresistibly into itself the means of its development. Whether the "civilization" of the Machine Age is preferable to Chinese civilization, for example, need not be debated here. No academic discussion can alter the fact that the best that can be done, both for the peoples of "backward" areas and for the peoples of the mechanized countries, is to diminish competition and so to improve the conditions of economic penetration.

Governments, having mandatory power over the international business commitments of their citizens, may participate at least to this extent: they have the power to discourage or check dangerous projects and to foment friendly international partnerships. Nor does this involve even so great a governmental supervision of export capital as is practiced now. Capital does not resent such regulation within reason, but invites it. There remains to be worked out the definition of those enterprises which are regarded as dubious or dangerous, when conducted competitively, and the terms on which individuals and corporations may participate in coöperative projects. There must be an intelligible agenda, so to speak. And it will be worked out, if ever it is, not by governments but by business itself.



CHAPTER FOURTEEN

POLITICS: From Agrarianism to an Industrial Dynasty

I

COMMONLY the catastrophe of the Civil War is accepted as the sharply dividing line between the old agricultural régime and Machine Age politics. Not until then was the southern planter completely unhorsed; not until then did the Mississippi Valley begin to be industrialized. But actually Fulton's steamship began operation in the first decade of the Nineteenth Century, and even earlier James Rumsey had invented a queer contraption which managed to navigate under automatic power upstream, but which did not prove practicable. Steam, which in England had been utilized to pump out mines, had been put within a vessel upon the water. It was the dawn of the Machine Age in this country.

Yet the real beginnings of modern politics, to my mind, were with what we are wont to call Jacksonian Democracy, in the thirties of the last century. It was then that immigration was vastly augmented, supplying a large market of industrial labor. It was then that anthracite coal was being mined, railroads being built, spinning mills and blast furnaces constructed. It was then that the political machine as we now know it, the spoils system, and the phobias against concentrated wealth first manifested themselves.

Quite as a matter of course we call a political organization a machine, and the campaign word "platform" properly connotes machine manufacture. As a fact the Machine Age has not only conferred a terminology on our political institutions but has profoundly affected them in other directions. We now have the prosperity of mass production as a national issue. At Washington we have observed a "million-dollar lobby" in operation on behalf of hydroelectric power, with many smaller lobbies there and in every State capital, devoted almost wholly to the machine in one form or another. The time-honored issue of a tariff for revenue only has disappeared. An arrogant Federal bureaucracy founded on the machine encroaches more and more severely upon the ancient doctrine of States' rights.

The cotton gin, which helped overthrow the oligarchy of southern planters, the locomotive, which transferred the center of Presidential gravity from the South to the Midwest, the internal-combustion engine and electricity, with which man lifted himself literally by his bootstraps out of his function as a craftsman, served to transform this republic from an agrarian entity, governed (as Jefferson thought it should be) by planters and farmers, into an economy governed by Big Business. "Cultivators of the earth," Jefferson wrote John Jay, "are the most valuable citizens. They are the most vigorous, the most independent, the most virtuous, and they are tied to their country, and wedded to its liberty and interests, by the most lasting bonds." In the Machine Age the politician regards the farm bloc as a monstrosity and the farm problem as a nuisance, to be solved only for vote-getting purposes. The calendars of legislators, executives and the judiciary are cluttered with economic questions, complicated beyond the vision of the Founding Fathers. Nowhere, perhaps, can we note the effect of the machine on politics to better profit than in the history of this United States.

II

By this I do not mean, of course, to say that many problems of a mechanized civilization did not present themselves clearly to the Founding Fathers, had they been far-seeing enough to perceive them and cope with them. The first cotton mill was set up in Pawtucket, Massachusetts, in 1793. But the Pilgrims had been at Plymouth but eight years when they began erecting gristmills, and Endicott's colony built a water mill at Dorchester as early as 1629. Boston had a tide-water gristmill, Neponset a sawmill, and William Penn's colonists used water power to make paper, grind corn, and saw lumber. New Jersey, New Hampshire, and Maine soon acquired such plants, and they were machine plants. All the colonies issued regulations for the management and control of these enterprises, some owned them, some subsidized them. Vermont actually fixed the prices of mill products. And when the Founding Fathers gathered to frame the Constitution in Philadelphia, in 1787, some of them actually took an afternoon off to see a trial of John Fitch's steamboat.

Thus we had in early days, even before the Federal Union was formed, the substitution of water power and of steam power for human muscular power. Yet none of the delegates to the General Convention seems to have realized that out of these phenomena was to come an industrial revolution, nor to have attempted to forestall them in the Constitution. Precisely a century after that document was written Congress created the Interstate Commerce Commission as the first of a group of fifty-seven bureaus and agencies which unite either two or all three of the governmental functions, executive, legislative, and judicial. This, of course, was in direct contravention of the wishes and the intentions of those who framed the Constitution, and who were enamored of Montesquieu's theory that these powers must be strictly separated, under a system of checks and balances.

It must be said, in justice to the Founding Fathers, that business in those days was strictly local, often localized within a single homestead, which was self-sufficing for all living purposes. Industry had not overflowed State boundaries, nor integrated itself on national and international scales. It should be remembered, further, that the majority insisted on a toplofty State sovereignty, and would not at that time have consented to any Federal form of regulation, control, or ownership. The faction that would have wiped out boundaries altogether was a negligible minority—negligible as to votes in the General Convention, if not in the influence of their opinions and writings on later generations.

It was the States individually which tried at first to accomplish the regulation and supervision which became necessary as the Machine Age began to come into its own. They tried to introduce a safety-first policy, for example, on the railroads, and in the late 'thirties of the last century began reporting loss of life and the maiming of passengers in the hope of governing the transport lines through public opinion. The railroads merely damned public opinion. In the Middle West teeth were put into such laws, although our State capitals had already become acquainted with the economic lobbyist, corpulent and corrupt.

In time all the States did this, and the railways, subject to varying conditions by twoscore disparate agencies, became willing to accept Federal regulation. Even their lobbyists at Washington, who had won rich prizes in subsidies and in strips of the public domain, finally unleashed the docile Senators whose election their money had won from State Legislatures. Thus, in 1887, the Interstate Commerce Commission, earliest and now the most inept of all these commissions, came into being with plenary powers, in effect, executive, legislative and judicial. It began with five commissioners; it now has eleven, and its history is strewn with railroad bankruptcies.

When the Constitution was framed, obviously, even the best prophet might not have foreseen the locomotive, but water power was in common use. Not until 1920, three centuries after we began employing water power in this country, was the Federal Power Commission set up, also to exercise Siamese governmental functions. Prior to that, to be sure, there had been a long and subtle encroachment of Federal authority on State sovereignty in the control of water power sites on navigable streams, the use of public lands, the construction of piers and dams, and in irrigation. The power commission was a brother of the commerce commission.

The Federal Trade Commission was born in 1914, six years earlier than the power agency, and was meant to administer the Sherman Anti-trust Act. The United States Tariff Commission was set up in 1916; there is a Federal Reserve Board, Shipping, Railway Labor and Federal Narcotic boards, and other agencies exercising two or three of the governmental powers. They are called "independent" and their officials are appointed by the President. The demerits of bureaucracy need not be debated here, nor the threat it implies against democratic processes. The point I wish to make is that these and similar agencies, almost without exception, are by-products of the Machine Age, and that they have helped to alter the whole political scene in our national and State capitals. It is impossible to reconcile the technique of republican government with the fact of an industrial autocracy.

III

Even the tariff is a machine-made political issue, although Congress in 1789 framed our first customs act. It would not have been framed if there had not been manufactured commodities to import and machined bottoms in which to import them. The second measure was based indeed upon Alexander Hamilton's famous Report on Manufactures, which urged that business be stimulated by tariffs and bounties, thus bringing employment to classes otherwise idle and "a more extensive use of machinery." The first act had declared for protection as a national policy; the second made it a national philosophy and economic system. George Washington favored it because it would make us independent of others, "particularly for military supplies."

Curiously New England, now the happy hunting ground of the protectionist, was at first opposed to high tariffs, because New England in that day was the seat of American shipping. By the time Andrew Jackson had taken office even the planters of Kentucky, Tennessee and Louisiana, although these were strongholds of Jacksonian Democracy, began to say that even if the tariff was disadvantageous to the agricultural hegemony then in control, exceptions could profitably be made in favor of hemp, flax, and sugar. The pressure on Congress became more severe, so that even Webster and Calhoun turned their backs upon their original positions and argued the virtues of protection for business. Not so Henry Clay. "Dame Commerce," he cried, "is a flirting, flippant, noisy Jade and if we are governed by her fantasies, we shall never put off the muslins of India and the cloths of Europe." He favored discriminating tariffs, however, to hit at foreign capitalists. The tariff had been raised in 1824 and 1828; it was forced still higher in 1832. South Carolina threatened nullification. In the succeeding chapter we shall discuss Jacksonian Democracy, its chief enemy, Whiggism, and the Democracy of to-day, as they stood and now stand toward the tariff and other issues.

Just prior to the Civil War the tariff schedules were somewhat reduced, but after that conflict they climbed higher and higher, with but brief and certainly not noteworthy revisions downward when the Democrats gained supremacy. There was now apparent what the framers of the first tariff bill could little have expected, that there was to arise in this country a tariff-bred system of trusts, based on the machine.

IV

In the meanwhile, what of the machine itself? Two decades before the Civil War it made manifest its potency. It transformed the social and political United States from a status quo into a state of fluidity. New England clippers were being driven from the seven seas by the steamship. The locomotive was pushing the frontier further and further westward, and the Ohio Valley was being industrialized. The semi-feudal slavery system of the South was being overturned slowly by the cotton gin, an authentic social and political revolution. After the Civil War, which Charles A. Beard and Mrs. Beard call "the Second American Revolution," these processes were accentuated. Midwestern cities measured the distance to the seaboard by hours instead of days. The sewing machine and the reaper relieved the ardors of the household and the farm. King Cotton had been uncrowned by the steel fingers of the cotton gin. Textile mills and blast furnaces dictated the national polity. Industry and commerce had triumphed over planting and farming in the political cockpit.

Inevitably the glowing political theories of Thomas Jefferson and Andrew Jackson were dimmed. The areas of Jacksonian Democracy had been invaded by the industrialist, and the sentiments first enounced by the French Encyclopedists, to be elaborated on this side of the water, lost their ring amid the clang of machinery. Jefferson's political philosophy may indeed, as Gilbert Chinard says, have been "distinctly an American doctrine" during the fifty years he preached it, but it was destined to become passé. Dr. Chinard says truly: "Thomas Jefferson did more than any other man of his generation to formulate the creed of Americanism. The man who was accused of being denationalized stands as the most integrally and truly American among his contemporaries." Whether that philosophy corresponds to present conditions, Dr. Chinard admits, is open to question. It began to lose its potency when working classes concentrated in the cities and began to think prosperity perhaps more important than liberty.

The occasional agricultural revolt on behalf of "easy money," as expressed in Grangism, Populism, and Greenbackism, was smothered whenever "hard times" were relieved. Out of these revolts came the political theories of William Jennings Bryan and the muck-raking period of Theodore Roosevelt's administration, which may be regarded as modified Jeffersonian echoes. It may be that Bryan was defeated, as Paxton Hibben says, because he was "doomed to be second in all things," and lacked the will to victory. But let us look with Thomas Beer at the Warwick of Bryan's opponent, the sponsor and spokesman for William McKinley. When Mark Hanna stood up in the Senate, Mr. Beer tells us, to argue for the Panama Canal, "machinery spoke; the blue prints of engineers and the coal in bunkers found a voice. A monstrous, docile power made itself heard." Hanna was "the foreman of an age," this Machine Age. He was a spiritual prototype of Herbert Hoover, although he lacked Mr. Hoover's technology.

Mr. Hoover's predecessor in the White House, reflecting on the period of Bryanism and Rooseveltism, observes with relief that the radicalism "which had tinged our whole political and economic life from soon after 1900 to the World War was past." Calvin Coolidge rejoiced that this country "had little interest in mere destructive criticism." He was right. Votes in national elections proved that the nation was little interested in the Teapot Dome scandal, the disgrace of Fall, Doheny and Sinclair, the corruption of Pennsylvania primaries. "Destructive criticism" was out of order.

The marches, maneuvers and engagements by which industrialism triumphed may be set down briefly. Transcontinental transport robbed the Ohio and the Mississippi of their rich cargoes and southern cities of a rich tribute, the Virginia Dynasty in the White House had been smashed by Jackson, and Jacksonianism had been smashed by the machine. Presidential candidates were no longer chosen from the South, but from the industrialized Middle West—oftenest Ohio—or from the roaring eastern seaboard, oftenest New York. The Republican Party, to its sorrow, once abandoned Ohio as the Mother of Presidents and moved into Maine to choose James G. Blaine as its candidate. It has not repeated the mistake, for it realizes now that, whatever the merits of her political leaders, Maine is not yet strong enough economically to provide a winning candidate. The machine had brought us to what Mr. and Mrs. Beard call "the politics of Acquisition and Enjoyment."

The Republican Party now became the party of capitalism and of prosperous farming, while the Democratic Party shrank to the skeleton of its former self. Only in the Solid South did it obtain the sustenance for real flesh, and even the South was broken in the political campaign of 1928. Mechanized industry was so firmly in the saddle, as we shall see, that its occasional favors to agriculture were dispensed with the air of a back-door hand-out to a mendicant.

V

If Maine is not yet strong enough economically, according to the political viewpoint, to supply a successful Presidential candidate, it is not because she has not rich resources. In potential water power she ranks third among the States east of the Rocky Mountains; in developed water power she ranks seventh. No State in the Union is more completely under the domination of Samuel Insull, power king, and his associates. Why, then, the lack of development? It was due to a law forbidding the export of hydroelectric power to other States, a law in which Maine was unique. She did not propose that Boston and its rich environs should enjoy the fruits of her rivers while her own industries and farmers suffered for lack of power and light. In the early Fall of 1928, after a bitter state-wide fight, she maintained this law despite the propaganda of the "power trust" raiders.

The propaganda methods of Mr. Insull and his associates, throughout the press, schools, colleges and universities of the United States, are too familiar to require recapitulation here. In Maine the whole press was docile to his bidding save the Portland *Evening News* under the editorship of Dr. Ernest Gruening, a courageous and hard-hitting liberal. I mention this here because I shall need to say something, in the chapter to come, about the decline of liberalism as a force in this country; the *Evening News* is an evidence that this power has not altogether perished from the American political scene.

It is mentioned, further, because the use of the lobby, and of propaganda to mass public opinion, is distinctly a product of the Machine Age. The Senate investigation of lobbying in the latter part of 1929 uncovered facts well known to Washington correspondents but seldom revealed by them. It came as an aftermath of the revelation that a propagandist representing three shipbuilding corporations, with unfulfilled contracts to do building and supply munitions for the Federal Government, boasted that he had wrecked the 1927 Geneva Conference on the limitation of naval armament. In Chapter Nine this matter has been discussed in its relation to the daily press.

Although I would be the last to dispute the uses of honest propaganda under democratic processes, and the last to deny that much of the propaganda now distributed may well be termed *proper*-ganda, I must say that the methods of the "power trust" and the big-navy advocates have contributed to popular disquiet and distrust. Such methods, indeed, helped create the political prestige alike of William Jennings Bryan and Theodore Roosevelt. Mr. Bryan lived to see none of his major proposals carried out save the income tax; Colonel Roosevelt lived to see his program fairly well embedded in national law. In the next chapter there will be a brief discussion of the causes that contributed to the closing of the muck-raking period in American publicity and politics.

VI

Slavery in its day, like prohibition now, was presented primarily as a moral issue. As a fact both are important from the economic standpoint. New England, which had introduced human servitude to this country, and which had provided the most zealous of those skippers who imported negroes at a profit, found that the fresh labor did not prosper in her own bleak hills but could be profitably utilized under the burning suns of the South. The situation was as irritating from the business standpoint as "cheap alien labor" is to the high-tariff protectionist. As a fact, however, the shameful institution could not be made to jibe with democratic institutions nor with the splendid rhetoric of the Declaration of Independence. Prohibition and the Eighteenth Amendment are supported by the pious on moral grounds, but Herbert Hoover and Henry Ford and a multitude with them approve them on economic grounds. As a fact, I take it, the use of hard liquor cannot be made to jibe with mechanical efficiency.

Even Sunday Blue Laws, now being urged by a devout lobby at Washington, are opposed on economic grounds.

And even the extension of suffrage to women had its economic background. Back in 1840, although women were employed in more than one hundred gainful occupations, teaching was still the only task open to educated women. To-day nine millions stand shoulder to shoulder with men in all the professions and in nearly all the work undertaken by daily labor. When they began to wield an economic power the politician paid more attention to them; and their entry with men into trade and industry heightened their sense of a right to political authority. Their part in the World War, undergoing in many instances perils as great as their male associates, and at home contributing to the material support required by our army in France, helped to validate their claim. Thus what was regarded as a social and moral right had implications based on the Machine Age itself.

The imposition of the income tax by Constitutional amendment came in 1913, and so did the direct election of United States Senators. It must be recognized that the election of Senators was taken out of the hands of State legislatures because of a popular realization that corporation interests, deriving their profits from the machine, devoted part of those profits to purchasing Senatorial elections. The restrictions of immigration in 1921 and 1924 were strictly economic, and contradicted one of the oldest ideals of this Republic. National prohibition came in 1919 and women's suffrage in 1920; and in 1929 the Supreme Court, by its decision in the St. Louis and O'Fallon case, sometimes called "the biggest lawsuit ever argued," added literally billions of dollars to the valuation of railroads now impending before the Interstate Commerce Commission. These are a few of the changes now impending or determined at the polls, or settled (most of them quite settled) in the courts, which in part at least were affected by the Machine Age, or were effected by it.

No one can take a view altogether cheerful of the effect of the machine upon politics in the United States. There has been a curtailment of personal and corporate liberty, the latter not in all cases to be greatly deplored. There has been a lowering of the high ideals which animated the figures who decorated the pages of our earlier history. There has been a recession from the standards upon which this Republic was founded.

But there has been an obvious phase upon which I have not yet touched. The use of swift rotary presses by newspapers and magazines, in spreading to the electorate facts about the issues and the opinions of the candidates, and in making a permanent record of these phenomena; the use of the motion picture in familiarizing millions, instead of hundreds of thousands, with the features and demeanor of candidates; and especially in national campaigns in carrying throughout the nation the very words of these men and women as they express their views and pledge future performances, are noteworthy. In a Government such as ours, now grown unwieldy for democratic purposes, these mechanical means of reaching every voter are not to be belittled or ignored. They are important. To the political optimist it must seem that they will make possible in time a general familiarity with the complicated questions that the Machine Age has brought to democratic politics.

CHAPTER FIFTEEN*

POLITICS (*concluded*): From Jacksonianism to Hooverism

I

WILLIAM HOWARD TAFT, Chief Justice of the Supreme Court, has said: "In the encouragement of the investment of capital we nearly transferred complete political control to those who controlled corporate wealth, and we were in danger of a plutocracy." This sounds as though the transfer had not taken place, and as though the danger had been escaped. Few political observers can agree with that construction. Our chief political parties are unaffectedly plutocratic and Dr. Nicholas Murray Butler, President of Columbia University, discussing the tariff, said late in 1929:

"This is no time to listen to the selfish pleas of paid lobbyists or to permit log-rolling combinations of special interests to use public authority for their own benefit in disregard of the far greater interest of the whole people of the United States. In short, a tariff formulated in the year 1929 should be very different from that. . . . The present eclipse of liberalism is so plain that he who runs may read." He declared that in concentrating our attention on wealth—machine-made wealth, of course—we had come to ignore the demands of personal liberty, and he urged a revival of the older intellectual and political ideals.

The older ideals had their last effective up-flare, according to the notions I advanced in the last chapter, during the Jacksonian period. It is true that at the turn of the century we witnessed a mass assault upon the citadels of wealth and privilege, but it can hardly be said that Jeffersonian and Jacksonian ideals were in full evidence even then. The Whigs, which flickered out of existence just after Jackson retired to the Hermitage in Tennessee, lost power because they would not face slavery and other outstanding issues. Although the principles they espoused resembled the principles of the present Republican Party, in other ways they still more closely resembled the present Democratic Party. To both the wealth created by the industrial revolution brought a spirit of compromise, a recession from earlier ideals, and a frank bid for plutocratic support. An examination of their records may prove useful.

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II

John Randolph of Virginia, after the Whigs began straddling and wabbling, exclaimed contemptuously that they had exactly seven principles, "five loaves and two fishes." They were standing around waiting for some miracle-worker to fill their bellies. In the election of 1928 many Democrats assisted in retiring to private life the only potential miracle-man of high visibility in the party. Obviously the curse of politics is the politician. The Democratic Party seems to suffer a little more in that direction than others of record. Quadrennially its leaders behave as though the first Tuesday after the first Monday in November were to be a Lupercal, and as though each of them were ready to cast the chief candidate in the rôle of Caius Julius Cæsar. Principles may go hang.

Perhaps it is hardly to be expected that a party will show homogeneity when it is composed of Protestant southern planters and industrialists, western farmers, eastern unionized laborers, Catholic Tammany, a Catholic machine in Boston, and other odds and ends. Consider, if you will, the origin of the Whigs from anti-Masons, John Quincy Adams followers, henchmen of Henry Clay, advocates of a national bank, nullifiers, states' rights men, and tariff men, with nothing in common save a hatred of Andrew Jackson and all he stood for. The Democrats have in common only the wistfulness of the "outs."

Every faithful partisan must be disquieted at the parallel between the Democratic Party of to-day and the Whigs of a century ago. Doubtless many faithful Republicans exult at it. The

resemblance is not in governmental theory, political principles nor tenure of life; it is temperamental, mechanical and emotional. Modern Democracy, like the Whigs from the beginning, lives solely as an opposition party. Both have supported a standardbearer thrice defeated for the Presidency. Both have been subject to internecine strife. Both have embraced heterogeneous and apparently incompatible elements. Both have been opportunist. Both have abandoned policies which gave them their first lease on life. The Whigs, during an existence spanning less than a generation, sent two men to the White House; since the Civil War the Democrats have placed but two men there. As a Democrat, it seems to me pertinent to inquire whether the party is now doomed to be snuffed out as were the Whigs.

It was in 1831 that a group of Adams-Clay "Republicans" nominated Clay and John Sergeant at Baltimore on a national ticket. No platform was adopted, but in May of the following year a "Young Man's National Republican" convention was held in Washington, and expressed its anti-Jacksonianism in ten resolutions, indorsing a protective tariff, a system of internal improvements by the Federal Government, the abolition of the "spoils system," no removal from office for political reasons, a central national bank, and the decision of Constitutional questions by the Supreme Court. Not until February, 1834, were these nuclei of a new party dubbed Whigs.

III

Even though the ten resolutions were mere negations of Jacksonian policies, the new party did start with a ground plan of principles. The first formal platform pronouncement by the Democrats did not come until 1840, and consisted of but nine resolutions. These were not negative, but positive and constructive. It is well to remember that a political platform, now generally derided, was regarded in those days as a solemn pledge; and it is well to contrast the lucid brevity of that original document with the flatulent rhetoric of the 1928 Democratic outgiving. The first platform ran to about five hundred words, so it may with profit be quoted here, that we may get into the record the upstanding principles that modern Democracy has abandoned:

> Resolved, That the Federal Government is one of limited powers derived solely from the Constitution and the grants of power shown therein

ought to be strictly construed by all the departments and agents of the government, and that it is inexpedient and dangerous to exercise doubtful Constitutional powers.

Resolved, That the Constitution does not confer upon the general government the power to commence and carry on a general system of internal improvements.

Resolved, That the Constitution does not confer authority upon the Federal Government, directly or indirectly, to assume the debts of the several States, contracted for local internal improvements, or other State purposes; nor would such assumption be just or expedient.

Resolved, That justice and sound policy forbid the Federal Government to foster one branch of industry to the detriment of another, or to cherish the interest of one portion to the injury of another portion of our common country; that every citizen and every section of the country has a right to demand and insist upon an equality of rights and privileges, and to complete and ample protection of person and property from domestic violence or foreign aggression.

Resolved, That it is the duty of every branch of the government to enforce and practice the most rigid economy in conducting our public affairs, and that no more revenue ought to be raised than is required to defray the necessary expenses of the government.

Resolved, That Congress has no power to charter a United States Bank; that we believe such an institution one of deadly hostility to the best interests of the Country, dangerous to our republican institutions and the liberties of the people, and calculated to place the business of the country within the control of a concentrated money power, and above the laws and the will of the people.

Resolved, That Congress has no power, under the Constitution, to interfere with or control the domestic institutions of the several States, and that such States are sole and proper judges of everything appertaining to their own affairs not prohibited by the Constitution; that all efforts of the Abolitionists or others made to induce Congress to interfere with questions of slavery, or to take incipient steps in relation thereto, are calculated to lead to the most alarming and dangerous consequences, and that all such efforts have an inevitable tendency to diminish the happiness of the people, and endanger the stability and permanency of the Union, and ought not to be countenanced by any friend to our political institutions.

Resolved, That the separation of the moneys of the government from banking institutions is indispensable for the safety of the funds of the government and the rights of the people.

Resolved, That the liberal principles embodied by Jefferson in the Declaration of Independence, and sanctioned in the Constitution, which makes ours the land of liberty and the asylum of the oppressed of every nation, have ever been cardinal principles in the Democratic faith; and every attempt to abridge the present privilege of becoming citizens and the owners of soil among us ought to be resisted with the same spirit which swept the Alien and Sedition laws from our statute-book.

IV

Read this last paragraph in the light of a Democratic Administration during the World War, when merely to recite the Declaration of Independence with an air of seriousness laid one liable to internment; in the light of a censorship of the press at that time almost as severe as any imposed by the Alien and Sedition Act; in the light of an immigration law which closes the door of this "asylum for the oppressed"—a law for which Democratic Congressmen by the score lifted their voices; in the light of disfranchisement of negro citizens in the Democratic South.

And what has become of the strict constructionism affirmed in the earlier paragraphs? Has not Senator Borah become almost sole custodian of the principle? The Constitution looked to a separation of the governmental powers, executive, judicial and legislative; Democrats voted for and are now serving upon a congeries of "independent" bureaus, commissions, and boards which roll together two or all three of these functions, and which have erected at Washington an arrogant undemocratic bureaucracy. What becomes of strict constructionism in view of Federal contributions to schools and road-building in the States, supported heartily by Democrats? What has become of a tariff for revenue only in the light of the 1928 Democratic platform? "All of us are protectionists now." What has become of defiance of special rights for capitalism and industry in a party which has been handed over to Raskobs and Baruchs? What has become of the fight on a central United States Bank in the party which passed the Federal Reserve Act, setting up twelve central banks instead of one?

These are rhetorical questions, of course. All of us know what has become of those principles. They have gone into the limbo of neglected things. When Grover Cleveland was elected in 1884 he confessed that he was at the head of a party whose "cardinal principles" had been "relegated to the rear and expedience substituted in the hope of success." That was the naked truth then and the naked eye does not perceive any improvement since that day.

V

Henry Clay was the candidate who thrice led the Whigs to defeat. William Jennings Bryan thrice served as the stalking horse for the Democrats. The Whigs succeeded in electing William Henry Harrison in 1840 and Zachary Taylor in 1848. Both died in office. Under the quaint electoral system of that day, which made it possible for a president and vice-president to hold quite different views, Tyler made the Administration Democratic when the Whig Harrison died. Well, when Grover Cleveland had a cancer of the mouth during his second Administration the fact was officially suppressed because, while Cleveland was a "sound money" man, Adlai E. Stevenson had Free Silver leanings, and it was thought better not to alarm the electorate in view of an impending panic. The facts about Cleveland's operations for the sarcoma were officially lied about for twenty years.

As for the Whig victory in 1848, it was achieved without a platform, and the party was so divided that it dared not face the slavery issue, even then more passionately debated than the tariff ever has been. The Democrats also evaded the slavery issue that year; but the Whig candidate, General Zachary Taylor of Louisiana, was a slave-owner. The timidity and straddling of the Whigs so disgusted Henry Wilson—subsequently Grant's vice-president—that he and his followers left the party and joined the Free Soilers, as one Democratic faction was then known: "Let the soil of our extensive domains," its leaders said, "be ever kept free for the hardy pioneers of our own land, and the oppressed and banished of other lands seeking homes and comfort and fields of enterprise in the New World."

Henry Wilson's defection was the beginning of a schism among the Whigs as disastrous as any factional fight among the Democrats since the Civil War. For the Whigs accepted Clay's compromise of 1850, and thus lost their Abolitionist element without gaining an iota of strength in the South. (What did the Democrats gain by the Tariff Compromise of 1928?) The Whigs were split into "Conscience Whigs," "Cotton Whigs," and "Silver-greys." And in 1852 an attempt was made to have the party endorse the fugitive slave law enacted two years earlier, which was fatal. In the election of that year they carried but 4 States and elected but 71 Congressmen of 234.

Clay's fatal compromise, which was to disrupt and destroy the party he had led three times to defeat, consisted of eight resolutions which are thus summarized in Stanwood's *History of the Presidency:*

> The admission of California as a free State;
> The new Territories to be organized without restriction as to slavery;
> The boundary to be established between Texas and New Mexico;
> The United States to pay the public debt of Texas;
> Slavery not to be abolished in the District of Columbia;
> The slave trade to be abolished in the district;
> A fugitive slave law to be passed;
> Congress to declare it had no power to interfere with the slave trade between the States.

In certain respects the careers of Clay and Bryan bear comparison.

VI

The Whig convention of 1852, which nominated General Winfield Scott for president—apparently in the conviction that flag-waving and old-hero stuff were sure-fire hokum for the hustings—actually adopted a platform. The Democrats nominated Franklin Pierce of New Hampshire, notable chiefly for his good looks and his conviviality; and under his expansive leadership they fairly crushed the Whigs. Many disgruntled members of that decaying party joined the notorious "Know-Nothings," who were animated by religious and racial prejudice against Irish Catholics and German-Americans.

It may not be amiss here to take a look at the political force that focalized the Whigs as an opposition party. Arthur M.

Schlesinger reminds us, in his *New Viewpoints in American History*, that even to-day the phrase "Jacksonian Democracy" is largely misunderstood. "To the ordinary reader of history," he says, "the phrase refers to a violent change in American government and politics effected during the years from 1829 to 1837 by an irresponsible and erratic military chieftain at the head of the newly enfranchised and untutored masses. . . . Jackson himself was a product, rather than the creator, of the new democratic spirit, for he rode into power on a tide of forces that had been gathering strength for more than a decade and which he had done little or nothing to bring into being. It will appear that the new democracy was 'Jacksonian' only to the extent that Jackson stamped the political phase of the movement with the imprint of his personality, lending it certain picturesque characteristics and dramatic qualities."

It was the present Republican Party which crowded the Whigs out of existence; and between this party and the present Democratic Party, as Doctor Schlesinger observes, there is now "no basic disagreement . . . as to theory of government; nor does either party take issue with the existing economic organization of society. The difference between the parties is largely one of point of view, partly one of temperament."

VII

The issues which had constituted the original Whig platform no longer interested the public by the time the new Republican Party was formed. On the new issues then engrossing the public the Whigs were too timorous to take a stand. How like the Democrats of to-day! They have abandoned the oldest issue in American politics, State rights, because they are afraid the electorate is not interested; they have abandoned the tariff stand, dictated by Southern planters who did not benefit from protective duties and did not want to pay high prices for manufactured commodities; they have learned their lesson about banking and currency; apparently the only Jacksonian policy which they espouse—along with their Republican enemies—is the spoils system. As late as 1860 there was a Constitutional Union Party which, at Baltimore, nominated a ticket composed of Bell and Everett; this was regarded as the last faint flicker of Whiggism. Can it be that the Democratic Party is headed somewhat in that direction?

That the Democratic Party has abdicated its post as leader in liberalism in this country is not the sole charge its disappointed partisans may bring against it. There are grounds upon which the abdication may be extenuated. The World War, prosperity, mass production, woman suffrage, each has been advanced as a factor in dimming liberal light; and there is the more persuasive argument that most of the causes for which progressive forces have labored have now been achieved. For the fiscal year ended last June 30, about two-thirds of the Federal expenses were paid by "the rich," that is, by income taxes derived from well-to-do or wealthy individuals and corporations. To make this tax possible a Constitutional amendment was required. A quarter of a century ago about half of the Federal income was derived from the tariff, and the better part of the remainder from internal revenue, levied chiefly on tobacco and intoxicants. The old passion against Wall Street ("the enemy country," Bryan called it), against the railroads and "predatory wealth," has greatly abated under a peaceful revolution by taxation. The editor of a liberal magazine which perished some two years ago complained that there was no longer an audience in this United States for that kind of publication. He had in mind, undoubtedly, the changed public temper about public issues.

It is as well to recall, in the circumstances, that the present Republican Party, at the outset, was a liberal if not a radical organization. Abraham Lincoln once charged a Chief Justice of the Supreme Court with conspiring to extend slavery into all the Territories, and William H. Seward declared there was "a higher law than the Constitution." Such were the fire-eaters the Republican Party once acknowledged as leaders, but neither of the major parties ever has enjoyed a monopoly of liberal or progressive impulses.

VIII

Who shall say that our modern Democracy, reducing its campaign deficit by a round million dollars in six paltry months, is not aping a plutocracy? Who shall say that its tariff stand is other than a bid for plutocratic support?

The Republicans themselves appeared none too happy in attempting tariff revision of a sort to please both the manufacturers and Herbert Hoover, who seems to favor rates no higher than "Al" Smith advocated during the campaign. Against the tariff bill as it passed the House arose protests from more than a score of foreign nations, hundreds of daily newspapers (Republican as well as Democratic), and organizations both of farmers and other consumers. It was a pretty kettle of fish for the party which from its birth had been identified with sky-high "protection." If the Democrats, by some act of Providence, had won the election, it would have been an extremely ugly and unsavory kettle of fish.

The Democrats, that is to say, cannot rationalize their tariff stand as they do their scornful abandonment of liberal leadership. The posture of world affairs points unmistakably toward the continuous lowering, if not the abolishment, of trade barriers. How shall the United States, a creditor nation, eager, moreover, to enlarge the foreign market for its surplus production, collect its debts or receive payment for its goods if it builds a wall around its ocean ports? Both bills must be paid in commodities, gold or services. If we shut out the commodities by heavy duties, if gold is lacking and its transfer injudicious in view of the effect on international exchange, if our immigration law effectively curtails payment in services, how are the bills to be paid? President Hoover has shown by his public utterances that he realizes the importance of this query. That the party dedicated to a tariff for revenue only, and not for protection, should be blind to it, shows it to be as opportunist and shifty as were the Whigs when they would not face the slavery issue.

The Prohibition issue the Democratic Party is fondly supposed to have faced. The party's leader faced it in 1928, by his demand for modification of the law, but it is preposterous to pretend that the party faced it. Here is a Texas Representative in the House asserting on the floor that a "whiskey ring" led by "bosses of high finance" is trying to control the party. "More than three-fourths of the Democrats in this House," he cried, "voted for the Volstead Act and have, on every proper occasion, voted to sustain it; and in so doing represented a like proportion of their constituencies. To use the party as a liquor bloc would be a perversion and a degradation." He appealed to all "dissatisfied and sickened" Democrats to fight for the control of their party. And here is a North Carolina Senator, who helped valiantly to throw his State into the Hoover column during the 1928 election, denying with heat the soft impeachment that he has made peace with the multi-millionaire chairman of the national committee. And here is a midwest gum-shoe organizer, scurrying about the country trying to restore some semblance of peace among the warring Democratic factions. The Whigs, even after approving the Compromise of 1850, were never more divided than the Democrats of to-day.

Years ago Lindley M. Garrison, for three years Woodrow Wilson's Secretary of War, suggested in an interview he gave me that there should be a party reorganization in this country along liberal and conservative lines. This was just after the World War, several years after Mr. Garrison had resigned his portfolio, but long before political thinkers had quite scrapped the notion of liberalism as a political force in the United States. There still lingered the memory of what hash Theodore Roosevelt's Progressives had made, at Armageddon, of the G. O. P. Despite the belittlers of liberalism, I recall that interview now with some speculation as to whether there might not be, even yet, a party of conservatism and "prosperity," waging war with those Democrats and Republicans who still remember Armageddon.

IX

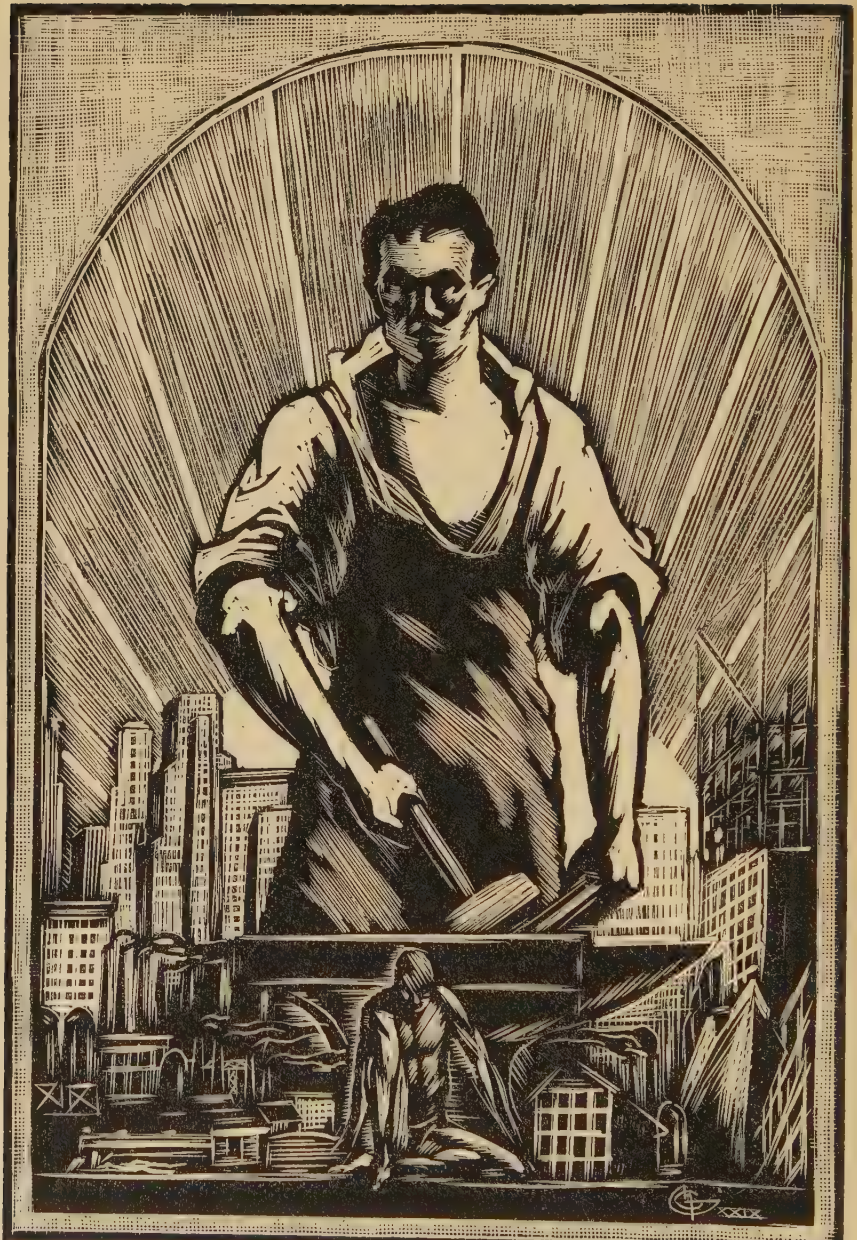
Speculation, of course, produces nothing more than a theory, and it is a condition which confronts the Democrats, to paraphrase a saying of one of their greatest presidents. Naïve optimists like Frank Kent, historian of the party, may say that its survival of so many defeats means it cannot be killed, just as Bert Leston Taylor used to say, fifteen years ago, that Lillian Russell was "indestructible." Both Miss Russell and B. L. T. have since gone to their reward. Political parties flourish frequently far longer than individuals, but they are not immune to decay and mortality. The symptoms of decay and dissolution are so pronounced to-day in our Democracy that any prognosis must find the necessity of a drastic major operation.

"Coolidge prosperity," which carried the Republican Party triumphantly through to victory in 1928, became a fiction and a laughing stock soon after that victory was consummated. The Wall Street panic in which a large percentage of the electorate lost its pooled billions, in the Autumn of 1929, sufficiently demonstrated the false bases of the prosperity campaign cry.

Herbert Hoover, who rode to the White House on the shining stallion of the prosperity cry, found, in the long run, that Republican "prosperity" was a worse political foe than poverty and bread lines. He had, however, an engineering and distinctly sensible mind, and he did not permit the stock market crash to interfere with the vast program of economic and mechanized progress which he had in mind. Between the warrior, Andrew Jackson, riding to the White House on a steed of flesh and blood, and the engineer, almost a century later, riding thither in a machine-made vehicle, there was a vast spread not only in methods of thinking and political ideals, but in methods of accomplishments and in political practices. It may be said, indeed, that this difference measures the spread between the old political technique and the new politics of the Machine Age.

No one can assert with assurance that Hoover technology is not precisely what the United States needs. The ideal of scientific government is as old as Plato. In mathematics and geometry he sought the key of the universe, and he thought the Deity "geometrizes continually." And Benjamin Franklin observed that "if statesmen had a little more arithmetic or were more accustomed to calculations, wars would be less frequent." Mr. Hoover has been revealed as drawing, during conversations, a mosaic of triangles, circles, parallelograms and similar patterns. He geometrizes almost continually. And Franklin's observation may perhaps be justified by the leadership Mr. Hoover has assumed in pacific disarmament endeavors. Will Rogers shrewdly notes that it is proposed to scrap or limit only such armament as will be obsolescent and probably useless if another war is fought; but the effort to lift even this item of outgo from the backs of groaning tax payers indicates at least the dawn of common sense in dealing with the frightful costliness of "preparedness." Advocates of preparedness argue, it should be said in fairness, that big armies and navies are guaranties of peace. I sometimes wonder whether this is like arguing that libraries make for illiteracy.

Hooverism was as much a product of its age as Jacksonianism of that time. They can be compared only in terms of the order they represented. To say, without taking into account the varying conditions which brought them into being, that either is superior to the other, is almost as though one were to say that a cow is superior to a horse. It is just possible that the two are incommensurate.


XXIX

CHAPTER SIXTEEN

LABOR: From Slavery to the Factory

I

ALTHOUGH we manufacture in this country one million wheelbarrows daily, most of them are for export. Many of the men who used to push them are now driving automobiles, and thus command multiples of the power under the hand of a Roman patrician in his chariot. Roger Bacon, who foresaw seven centuries ago "machines for navigating without rowers," and "cars without animals," was thrown into jail as an impious heretic. His prevision of the steam, gas, electric, and oil ages could not be made to jibe with the orthodoxy of his day. Yet a government bureau at Washington now estimates that automatic machines put at the beck and call of the average workingman the equivalent of fifty servants.

This workingman, with his invisible retinue of slaves, was himself, not so very long ago, a slave. Hume regarded slave labor as antiquity's most important social difference from the life of his time; and Edward Everett Hale once said that civilization should be measured by the difference between the worker who used his body and the worker who used his brain. On that basis, who shall say that the United States of the Machine Age is not more civilized far than the countries of Archimedes and Aristotle? How many slaves in Egypt, how many helots in Greece, would have been needed to lift the steel beam now lifted lazily with one hand on the derrick's throttle? Mankind has put the sweatier tasks behind him, yet in the United States alone installs annually more than one million new bathtubs.

At the price, some one groans, of becoming a robot, a modern slave! At the price of developing a new idleness which brings detriment rather than profit or improvement! At the price of lost craftsmanship and a spiritually deadening monotony! We no longer assign labor to the captives of war, but we have our wage slaves instead. The machine has thrown busy men into disemployment, bandied them from farm to city and from city to city, and robbed them of honest pride in their work. Between the economic cheer leader, who can see naught but good in the machine, and Jeremiahs such as I have indicated, runs a Grand Canyon of controversy. The Jeremiahs, it must be said, are the more lustily vocal. Let us make a surface audit of the account, and see whether we can arrive at a just estimate of our own.

II

Even "wage slaves," it must be conceded, are in somewhat better case than the victims of a war-bred system of slavery who built the Roman aqueducts and military roads, or even than the victims of the peonage system which grew out of it, who could not marry nor move their dwellings without the consent of their "employers." But human slavery has not yet been abolished; it remains a problem for the League of Nations. In so-called civilized nations it has been abolished but recently, as recorded annals go; and in the process the machine, no less than moral sentiment, played a part, at least in the United States.

This country, in which life, liberty and the pursuit of happiness were early declared to be inalienable rights, was among the last, in the western world, to do away with that institution which caused Thomas Jefferson to tremble "when I remember that God is just." George Washington's will liberated his human chattels, and he agreed with Jefferson that he hoped the system would speedily be abolished. The other Founding Fathers were slave-owners. The Quakers began agitating against the institution in 1696, and continued the fight for years; this is a bright spot in the history of a State now among the cruelest and most corrupt in its treatment of labor. Yet that early agitation accomplished little. John Adams, Patrick Henry, James Madison, and Alexander Hamilton all professed to agree with the Quakers, but they did not protest with noteworthy violence, any of them, when a fugitive slave clause was incorporated in the Constitution. It is true that the words "slave" and "slavery" were studiously omitted from the document because, as the devout Madison explained, "we did not choose to admit the right of property in man" in direct verbiage.

Vermont, in 1777, and New Jersey, in 1804, took the lead in legal steps toward emancipation, yet the system remained a primary factor in production. It was bolstered time and again by Federal law and even in the attempt, in 1854, to acquire Cuba, a part of our record with which students of the Spanish-American War might familiarize themselves to advantage. In the District of Columbia itself the slave trade was not abolished until 1862, and the Constitutional amendment prohibiting slave-owning was not adopted until two years later. Yet behold: Denmark had abolished slavery as early as 1792, and England in 1807. It is true that there were evasions of the English law until sharp teeth were put into it in 1811.

It is now nearly a century since the United States wiped its slate clear of human servitude in chains, and during that period the workingman, by unionization, has established pretty securely, in the enlightened parts of the Union, the right of collective bargaining. Yet even at the turn of the last century less than a dozen States were trying to regulate or abolish child labor. Boys and girls worked long hours, at pitiable wages, in mills, factories, shops and mines. Women, receiving fifty cents a day, could be employed all night, sometimes with no legal limitation on the number of hours, seven days a week.

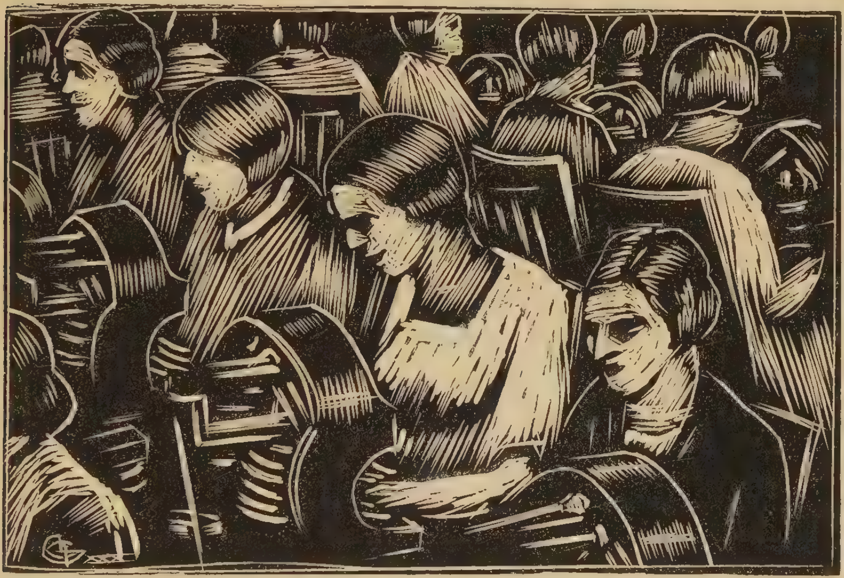
Since 1900 many betterments have been effected, but no one can pretend that this land of the free is quite a paradise for the laborer. Pennsylvania coal operators still have their privately employed thugs, known until recently as the "coal and iron police," to fight trade unionism. Coal-mining is the most backward, bigoted, and ignorant of our major industries, but the abuses it has perpetrated in Pennsylvania would have been impossible without the cynical and callous coöperation of the Mellon-Reed-Vare political machine in that State. There could have been no such system of terrorization, and security in the mutilation or murder of workingmen, had Andrew Mellon, for example, set his face sternly against it. The policing of industrial disputes in Pennsylvania and other emulative States is one of the gravest aspects of the labor problem in the Machine Age. It is not a by-product of this age, I believe, but an inheritance from barbarism, just as the assaulting, flogging and murders of striking workers at Gastonia, N. C., were in lineal descent from the textile industry's patterns and practices as set in New England.

In New York City, which pays many girls and women less than a decent living wage, Alice Foote MacDougall, the millionaire owner of a chain of restaurants, has been revealed by legal action as actually charging girls for the privilege of working as waitresses in her places and collecting tips from her customers. Mrs. MacDougall blows somewhat like the Pennsylvania coal operator, but she tempers the wind to the shorn lamb and the State law.

III

Such instances as these, it should be said in fairness, are comparatively rare, in view of our huge population engaged in gainful effort; and the widespread indignation aroused by each abuse bespeaks a more liberal modern temper in this field. We may not have achieved Carlyle's ideal of the dignity of labor, but as a people we resent, frequently, even judicial interference in labor troubles by means of the injunction. We have listened with credulity when the hard lot of the robot-workman chained to the machine was described, mostly without pausing to learn that but a small percentage of labor could possibly be so catalogued. Nor have we always taken into account that although the guild has practically disappeared, there is not yet a complete loss of pride in output, nor a complete destruction of skill in labor.

Of the machine tender, aside from that small fraction which, sometimes actually chained to the monster it serves, may deservedly be termed robots, in the sense Capek had in mind when he coined the word, it should be said that boredom and nervous fatigue usually accompany his labor. The noises and rhythms of the shop, the repetition hour after hour of motions and postures involving the same sets of muscles, and the fear that he is insecure in a job often new to him, are grave disadvantages. Nor is it any comfort to machine tenders to reflect that the present tendency is toward completely automatic devices, with perhaps a single man to watch or tend a dozen of them. This reflection makes the worker resentful, and heightens his sense of being a newcomer, perhaps an outsider.



And certainly it is true that a machine tender, performing a minute fraction of the labor on a piece of metal or wood or other material, whose origin and destiny probably are unknown to him, can feel in his work no such personal pride as the cabinet worker of an earlier day. Not all of our earlier workers, however, were super-skilled carpenters. The negro picking cotton in the southern fields, or the men and women tending spindles in the textile slum-cities of New England, can hardly be supposed to have experienced any great spiritual aggrandizement from their toil. And in many cases they were no closer to the employer than the modern machine tender.

Yet when the farmer took his flax to the weaver on the hill, and knew by his first name the carpenter at the end of the village street, there was nothing impersonal about industry. The bench worker owned his capital, which were his home and the tools ready at his hand; his helper was a youth chosen because the employer knew the qualifications of the boy's father. When industry moved from the home to the factory a deal was done to increase the dignity and livableness of the home, but man-to-man contact was lost in a maze of machinery. The weaver and the bench worker no longer owned their capital, but became numbered "hands." Often they did not even know by sight the owner of the plant.

IV

Long before the Machine Age dug this chasm between the worker and his employer, skilled workers, who should have been the best satisfied, theoretically, began to unionize. Even while Washington was still President the shoemakers of Philadelphia organized, and in 1799 conducted a strike. I have said that the greatest improvement in working conditions had come since the abolition of slavery; but back in 1836 there were fifty-two unions in New York City, one more than that in Philadelphia, twenty-three in Baltimore and sixteen in Boston. Nor is the shuttling of workers from city to city peculiar to the Machine Age; in 1834 the first attempt at a national trades organization was made more difficult because workers moved from town to town or fared westward to take up land; they were replaced by hordes of immigrants, clamoring for their jobs and others, but not converted to unionism. That first national federation lived but three years; but before the Civil War began such skilled workers as printers, iron molders, stone cutters, hat finishers and others were well organized.

It was after the "second revolution," as the Beards call it, that welfare work developed in our factories, and assumed, often, disagreeable aspects of paternalism. By and large, however, it must be admitted to have benefited the worker. Not until this century was efficiency so apotheosized by industry that new high priests of the new religion were established in the person of planning and efficiency engineers, traffic and lighting experts, and above all the personnel autocrat. This last was a specialist in psychology and employment maladjustment. Some years ago, while associate editor of a business magazine, a story was told to me about one of these specialists, which has never been printed, so far as I know, and which may be worth setting down here, although I do not feel free to name the man who gave it to me.

"Back in 1914 a friend of mine," he said, "was owner of a factory making a kind of magic lantern. The movies cut in on his sales. Through an accident, almost, my friend put out a product in another line, a self-propelled vehicle for boys, and this new product soon threatened to run away with the whole show.

"New equipment and new processes of manufacture and sales were necessary. In the reorganization one of these psychologist personnel specialists was called in. He had all the tests on words and thought leads and whatnot down pat. He was a psychoanalyst, too; and when he interviewed the factory manager he gave the man a big black mark. This man, he vowed, was better fitted for sculpture and music than for works management. In the belief that the fellow ought to have a fair chance at life—and because he had paid the psycho-analyst such a big fee he was bound to accept his decisions—my friend discharged the factory manager. And the factory manager, out of his savings, started a little plant near by to make the new specialty.

"About eight months ago my friend came to the bank I'm a director of to borrow some money. What did he want with it? Well, he wanted to buy out his biggest competitor. And who was that? It was the fellow who was so well fitted for sculpture and music.

"The same kind of expert once wrote to the concern I'm president of. For a stiff fee he was willing to deliver a series of lectures to my employees on human efficiency. It was a good letter, but it didn't have a stamp, and our street address was wrong. That fellow should have given his lectures to his own mailing clerks. Incidents such as these are bringing the personnel experts into disfavor, and they do not now disrupt as many organizations, built up through years, as they used to do. And no employer gets coöperation from his men if Mike Patullo, who lives on Sixth Street and has a house, a wife, and four kids, is only Number 1164 on his time-clock list."

As for the lost touch between employers and workers, this condition is being remedied rapidly in the majority of plants. I once went with the president of a motor-truck corporation through his factory in Philadelphia and heard him address worker after worker by his first or last name. A Toledo manufacturer requires his department heads, the export manager, auditor, tool designer, and so on, to begin at the bottom and learn the manufacturing processes step by step, learning at the same time to know the foremen and underlings in all departments. These executives spend three afternoons each week in overalls, laboring as factory apprentices.

V

A psychologist of Columbia University, Dr. Harry Dexter Kitson, avers—although I do not find that he blames the Machine Age specifically—that half our workers are maladjusted. His inquiries had revealed an annual turnover of labor in a group of cities running from fifty to one hundred per cent., and he believed that this was mainly due, not to progression toward better jobs but to discontent and ill-placement in work. He blames the "crime wave" on it. "The solution," he observed, "lies in more efficient and more complete vocational guidance and training. The worker should be helped to discover his interests and should learn to exercise them competently." This is an argument, obviously, for the psychologist personnel specialist, and is likely to go unheeded at least by some employers. But Dr. Kitson has some interesting things to say about the middle class and what he calls "the white collar idea."

"This is one of the most vicious misconceptions in our civilization to-day," he observed. "Too many mothers are afflicted with the desire to have their sons become bank tellers so they can stand behind the wicket and pass out greenbacks or say 'hello' to the president." (One is about as likely as the other; greenbacks are a negligible fraction of our currency now.) "They let their sons work for $31 a week. . . . That is the average salary of bank clerks in Indianapolis. . . . The plumber has a greater certainty of becoming the boss and directing his own business some day than any white collar worker. In Indianapolis, for example, the wages of plumbers are $56, as compared with the $31 of bank clerks. How much happier bank tellers would be if they had turned to plumbing! It would add $1,300 to their annual earnings and they could be secure in the knowledge that they can lift themselves to bossdom. Plumbers are driving more cars than bank tellers, and that is the crux of the whole matter."

Well, more plumbers than college professors are driving cars, which is "the whole crux" of another matter, if there is any single fact which constitutes a crux in a situation so complicated.

Yet I have no intention of dismissing with a quip a labor problem which has invited attention since before the beginning of the Machine Age. Henri de Man, in his book *Joy in Work*, translated by Eden and Cedar Paul, asserts that work can be made joyful—that is, that maladjustment can be remedied—by making working conditions pleasant and by the assurance that achievement will be appreciated. This appears to be somewhat obvious, but it is as far, I suspect, as any one has got toward an answer. Let us consider, as the reverse of the coin, the case of an apparently perfectly adjusted employee.

VI

Miss Julia Hanlon, in the Fall of 1929, completed sixty-four continuous years of work in a New Bedford, Mass., textile mill. She had begun as a sweeper at the tender age of seven, and then had worked up to three spinning frames, six, nine. For fifty-two years she worked as a weaver in the same room. "Believe me," she told a newspaper reporter, "I know what the inside of that room looks like." Yet she vowed that all her years at the mill had been spent pleasantly, with never once an illness serious enough to call for a physician. During the World War she made as much as $32.50 a week, but soon afterward her salary was deflated to $16.15 a week, and in 1926 she was transferred from her post as weaver to that of presser. She had no complaint to make of this. She did not complain that the daily roar of the mill had made her somewhat deaf. She was perfectly adjusted, to all intents and purposes, and doubtless her New England employers patted one another on the back for having driven such a profitable bargain with her.

Yet, glancing at this record, we may well speculate whether the maladjustment of which so much complaint has been made may not have proved, in some instances, akin to the divine discontent which has driven forward the inquiring mind and added mite after mite to the sum of mankind's knowledge. One begins to wonder whether a well adjusted worker like Miss Hanlon, spirited and intelligent though she unquestionably is, may prove in the long run to be as useful a member of society as some of our misguided, discontented, and maladjusted workers. It is worth pondering.

VII

Miss Hanlon's drastic wage cut of more than fifty per cent., to a pittance of $16.15 weekly, was made by New England employers, and, however contentedly she accepted it, must not be accepted as indicative of conditions elsewhere than in her own section of this country. On the contrary, the wages of women and of unskilled workers were better, in the United States and other civilized countries, than the pay of skilled artisans. The International Labor Office at Geneva published, in the midsummer of 1929, statistics from many countries, covering conditions as of 1928. The countries were the United States, Germany, France, Great Britain, Canada (separately), Australia, New Zealand, South Africa, Sweden, Denmark, Switzerland and Czecho-Slovakia—the last-named being the native land of the playwright who invented for our convenience the word robot. In the countries different methods are followed, in many instances, in compiling labor statistics; the Labor Bureau at Geneva used index figures for each, based upon pre-war wages as 100. As between skilled and unskilled labor since the war, in those countries which make the distinction, I have drawn from the report the following table:

Country	*Skilled*	*Unskilled*
United States	235	245
Germany	159	197
Denmark	250	273
Switzerland	201	202
Canada	188	187

As for women, the wage increases since the World War in those countries which separate these figures, the report gives these statistics:

Country	*Men*	*Women*
United States	240	259
Australia	192	213
Denmark	262	280
Canada	196	252
France	750	856
Sweden (1927)	267	300
Switzerland	201.5	197

For this country, Denmark, and Switzerland, the figures for men were based on an average of wages for skilled and unskilled labor.

Now let us take a somewhat more general view as regards the United States. Exclusive of agrarian labor, the average worker in this country received in 1928 $2.30 as compared with $1.00 in 1913, and three times as much as he or she got in 1900. The farm laborer got two and one-half times as much as in 1900. In the last fifteen years the bricklayer has multiplied his wage by two and one-half, the Chicago carpenter from 65 cents an hour to $1.50, the Pittsburgh painter from 55 cents to thrice as much, and the Jacksonville plasterer from 56 cents to $1.75.

But what does this mean as to "real" wage increases? How does it relate to the higher cost of living and the decreased purchasing power of the dollar? The Department of Labor at Washington has mulled painstakingly over these questions, and is authority for the statement that the purchasing power of wages was 23 per cent. higher in 1923 than ten years earlier, and 33 per cent. higher in 1924 than in 1913. In 1925, the last year for which I have an estimate, the increase is given as 37 per cent. I do not doubt that by 1930 the increase had reached 50 per cent.: that is, that wages had doubled since the war in purchasing power.

In spite of these rosy figures, Henry Ford announces wage increases which, it is estimated, will add nearly twenty million dollars to his payrolls during 1930. The estimates are based on the belief that Mr. Ford will maintain a full personnel, although he has been known to lay off sixty thousand men at one stroke, and his statement about the new scales makes no promise that he will not do this, or something like it.

VIII

This republic foreswore a fundamental principle of its organization, that it should be forever an asylum for the destitute and oppressed of all the world, when it restricted immigration, mainly at the behest of organized labor, which thought thus to constrict the open market. And then labor saw with dismay that its jobs were emigrating to other countries, through the export of capital and the establishment abroad of branch factories. Midway of 1929 it was asserted that there were at least two thousand such branches, and that the number was growing day by day. Thus Henry Ford began manufacturing tractors in Ireland, and abandoned manufacturing them in the United States. Since tractors are listed as agricultural machines, which come in duty free, there was no tariff to pay on this product of foreign labor.

Electrical manufacturing corporations established branches in Japan and China, where incandescent lamps were produced with automatic machinery and cheap tenders. A jute-consuming plant was moved from Maine to India, where it could save money both on its raw material and its wage scales. To this growing movement, as well as the displacement of workers by more and more automatic machinery, may be attributed the widespread disemployment of 1928 and 1929. Meanwhile we were exporting annually machines worth about $250,000,000, to modernize competing plants abroad, and so were strengthening our "enemies" in the "war after the war," of which we heard so much just after the Armistice was signed; the international war for export trade. The assertion has been made that by selling shoe machinery abroad, after manufacturing it in the United States under a patent-monopoly, our export of shoes to several Latin-American markets had been gravely crippled, reducing the demand for labor in that field. A soap company established a branch in France to supply the large trade there (fancy the dainty French buying soap from mere Americans) and thus reduced its personnel in the United States, whence had come this supply theretofore.

Yet labor was pushing restlessly into new fields, and machines were constantly opening new jobs. When machines first made their appearance, manual workmen smashed and burned them, until they discovered the uncanny fact that these devices, which supplanted them temporarily, in time opened new tasks for them. The working masses are in a state of flux, and the shift is partly from productive effort to services of various sorts: operating elevators, driving taxicabs, managing shoe-shining places, working in garages and motor-filling stations, radio shops, apartment houses and office buildings, in restaurants, gymnasiums and bath houses. In places such as these may be found men physically competent to labor in the mill or the factory, but drawn to new means of livelihood by the high "standard of living" which demands daily new and more numerous points at which human service of one sort or another may be commanded.

For four decades prior to the turn of the last century, the shift of labor had been chiefly from the farm to the factory. Now a return movement is under way, not so emphatically to the farm as from basic production. In the South the negro, threatened with disemployment by the automatic cotton-picking machine, is being encouraged—in case he does not long for higher wages in city factories—to leave the plantation and begin farming for himself. It is an occupation for which he has some natural aptitude, while lacking, as a class, the capital to equip a farm with modern machinery. As for workers in mines, manufacturing and transportation, millions have been displaced since 1920—in the main productive industries, according to the Bureau of Foreign and Domestic Commerce, more than a million and one-half men, and more than three hundred thousand from the railroads: but the same bureau is authority for the estimate that between 1920 and 1927 more than one and one-half million men went into motor repair work, automobile driving, and other non-manufacturing work connected with these machines. In that period the radio industry took on 125,000 additional employees, public services 100,000, construction work 600,000, commerce two millions more, the motion picture 150,000, teaching 185,000, professional work about 70,000. The increase in farm labor, during these recent years, has been most marked in Ohio, Michigan, the South Atlantic and Pacific Coast States.

We put behind each factory worker three times as much machinery as England, France or Germany. Henry Ford and Thomas A. Edison declare that the drift is toward more completely automatic machinery, with power employees. How close we have come already to that ideal of the inventor and employer is indicated by the A. O. Smith Corporation, which has undertaken—not quite successfully so far—to make automobile frames with no human assistance save a few push-button men. As it is, the work is so nearly automatic that with one hundred and twenty supervisors and tenders, the plant builds eight thousand motor frames a day. The goal, it appears from the statement of L. R. Smith, president of the corporation, is ten thousand frames daily with very few or no men at all. His thought was turned in this direction by watching his working men do over and over again, monotonously and almost automatically, the same thing for hours.

"We worked back and ahead," he observed, "from stations which demanded the maximum of mechanical response, such as the point of final assembly, where the frame on its moving jig pauses in the grasp of metal fingers, out of which, from basement hoppers, are shot by compressed air, at the rate of one million a day, the cold rivets that are dowled a few seconds later in the frame." He expects soon to produce one finished frame every six seconds.

IX

The decrease in productive employment brought by the machine, with the increased productivity of those remaining in employment, gave labor shorter hours and higher wages. It brought also overproduction, for which plant expansion during the World War paved the way. "At our trade conventions," one manufacturer has confessed, "we talk curtailment of production—which is never accomplished, although every one recognizes that somebody has got to quit. Then the professional optimist rises and states that there is no such thing as overproduction, that what we refer to by that term is really underconsumption. . . ." This, although said in 1928, is reminiscent of Mr. Hoover's Committee on Recent Economic Changes, which reported a year later that overproduction was merely illusory! The manufacturer continues:

"After that I go home and decide that we must lower costs or die in the attempt. Two years ago it required forty minutes of payroll labor to produce one unit of our goods. Last year we reduced it to thirty minutes, and this year we have got it down to twenty and one-half minutes. . . . New price sheets are gotten out based on our improved costs, but we find that our equally harassed competitors have been fired with the same zeal, and have done much as we have done. . . .

"In our business we have come to the appalling situation wherein it costs us nearly twice as much to pay for the manpower involved in selling the goods as it does to pay for producing them." This, obviously, is the familiar complaint that American business genius has devoted itself to production rather than to distribution. The high cost of selling—or distribution—brought what was called a "profitless prosperity"; and there followed upon this a discovery unprecedented in labor history. This was that to consume the output there must be greater purchasing power, and that the way to augment purchasing or consuming power was to pay the worker higher wages. The old, blind and stubborn theory that low wages meant an economy disappeared in the light of this new sun, now seemingly a fixed star in the firmament of Big Business. But the new theory had a partner, perhaps better called a twin. It was that the whole American public, in a frantic effort to consume its share of overproduction, began purchasing more than it needed, so that the cost of living mounted.

X

In this Twentieth Century the noteworthy characteristics of American labor are its freedom of movement, specialization, and coöperation. Dr. Nicholas Murray Butler of Columbia University, who feels called upon once in every so often to warn us of the state of the Nation—a task Constitutionally imposed upon the President—says that the trend toward specialization is creating a modern Tower of Babel, and breaking the world into fragments unintelligible to one another. It is true that the world professed to be amazed, a generation or two back, at a German linguist who devoted an entire lifetime to the study of the Greek dative. Dr. Butler, however, is a modern. Yet surely nobody need be surprised nowadays at specialization, especially the minutest subdivision of work. A dozen men do the task once confined to a single worker. One inserts the bolt, another tightens it, a third tests it; and the old cobbler's stint has been so split apart that even the shoe-edger does nothing but edge shoes. "All trades, arts and handiworks," said Immanuel Kant, "have gained by division of labor, namely, when, instead of one man doing everything, each confines himself to a certain kind of work distinct from others in the treatment it requires, so as to be able to perform it with greater facility and in the greatest perfection. Where the different kinds of work are not so distinguished and divided, where every one is a Jack of all trades, there manufactures remain still in the darkest barbarism." And Horace M. Kallen, in *Culture and Democracy in the United States*, amplifies the thought in a striking passage:

> The machine simultaneously divides and unites men, for it separates a single act of production into many mechanical steps, each step with a worker to mind it, and all the workers dependent on each other in the degree in which the labor of the single act of production is divided. So the machine makes for diversity and coöperation, which become humane as they become conscious and organic in the workers. So, also, it invites equality, for in the process of production where every step is an ineluctable essential to the completion of the act, no claim can long be successfully maintained for the greater importance of any one step, as the slow but undeviating movement of trade-union practices from craft toward industrial organization attests. . . . And this [the facilitation of transport] in its turn has reënforced industry in directing masses of men from a sedentary to a mobile habit of life, so that hardly any men of an industrial society live where they were born or work at what they were trained for. The circle is complete, thus; a vicious circle to those who resent the going see it. Let them, however, follow its true bent, and it may become the Platonic circle of perfection. Within it, peoples, cultures, races, religions, become swift neighbors. Strangers cease to be strange, aliens become familiar without ceasing to be different. The misunderstandings of aliency wear down. Contact generates tolerance. Men learn to respect difference, to mitigate the instinctive demand for conformity. Peoples of diverse origins, habits and standards are more at home with one another. Industry and its derivatives have rendered them more interdependent and the world-wide integration of societies which it has effected, in the competition, it is true, for empire, nevertheless repudiates the competition and slowly compels the conduct of governments and ideals of peoples to congruity with the basic facts of industrial life.

Bertrand Russell, who has almost a habit of disagreeing with his good friend Dr. Kallen, although both are militant liberals, takes a somewhat more pessimistic view of modern working conditions. In an article on "The Sedentary Age" in *Nation's Business* he asserts that "the experience of a man who performs one monotonous task in a factory is less varied than that of the old-fashioned handicraftsman"; and tells of a cobbler and blacksmith in a Cornwall village where he spends part of each year.

These two carry on their trade by ancient methods, and Mr. Russell says their work "is cheaper and better than any to be found where modern industrial methods exist." Once, searching for the cobbler, he found his man with the blacksmith, discussing affairs in China, and notes that "the views of both were shrewd and singularly well informed." From this instance he draws a conclusion: "They both enjoy life and have a leisurely existence, and I am persuaded that, although their earnings are small, their happiness exceeds that of the great majority of industrial workers." But Mr. Russell, eminent alike in the fields of mathematics and philosophy, certainly would not generalize from this specific instance to the advantage of the old craftsmanship over the new industrialism. He does, however, reach these interesting general conclusions:

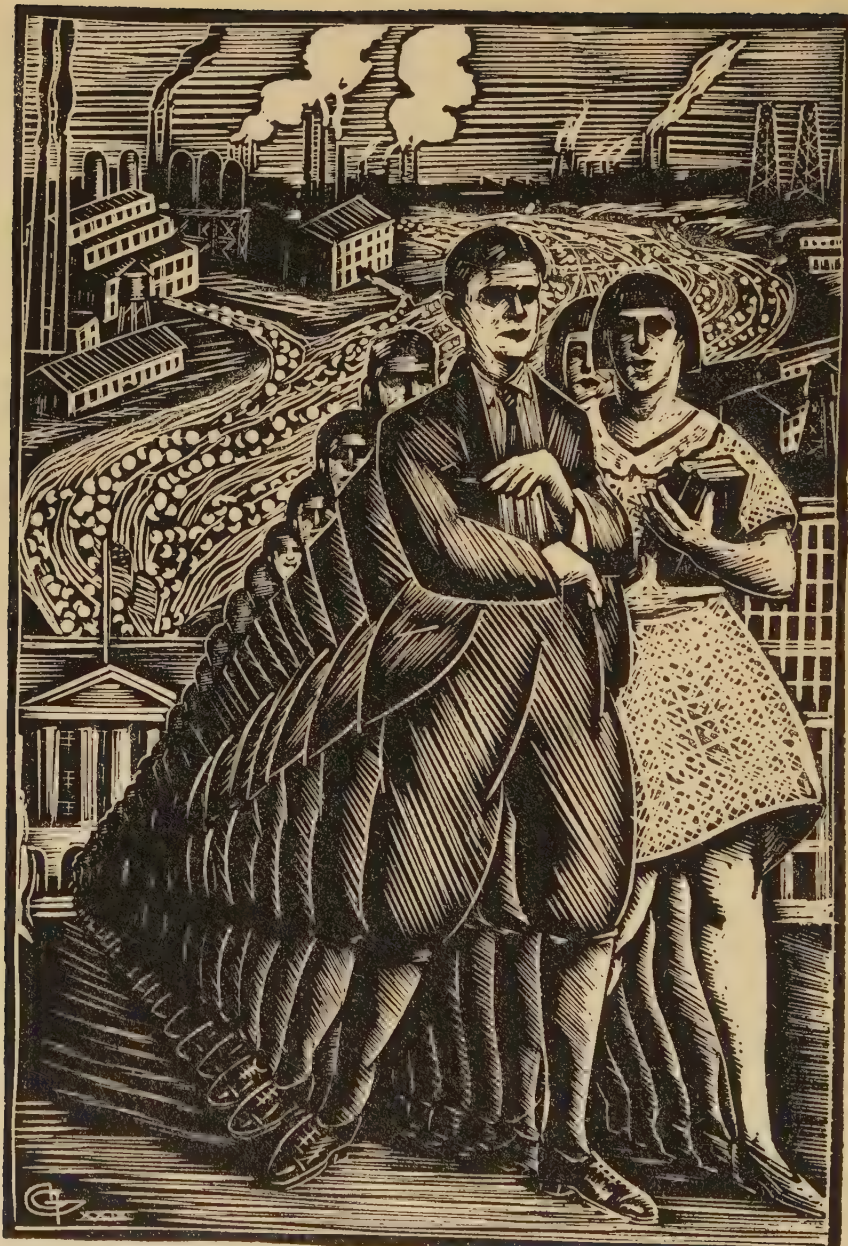
> Variety in work nowadays is the privilege of a minority composed of two opposite sections. On the one hand are those who represent the decaying remnants of older methods, and on the other, those who supply the brains for the newer mechanisms. Of the former the cobbler and the blacksmith of whom I have been speaking are instances; so are agricultural laborers, sailors on sailing ships, pioneers and empire builders.
>
> The charm of empire building to the energetic young Englishman is that it supplies work without monotony—a charm so great as to make him prefer the risks of fever and assassination in an African swamp to the lucrative safety of an office at home. But the empire builder and the pioneer belong to a vanishing order, just as truly as does the handicraftsman. . . .
>
> It is difficult from a practical point of view to maintain that the old variety of work should be preserved. Kropotkin used to urge that all the work connected with books should be done by authors. When an author had finished writing a book he should find other authors to help with the printing and binding. One infers, what is otherwise known, that he did not live in a literary clique, for if he had he would have realized the difficulty of getting one author to set up another author's book. The only strong argument I can see in favor of his plan is that it would immensely diminish the number of books published.

Mr. Russell thus himself evokes a doubt about the very point which he, and most other publicists in England and the United States, urge against the Machine Age. Yet he holds that Plato and Shakespeare, "in spite of never having a bath and being unacquainted with electric light, were more civilized than the most luxurious modern is." This depends, of course, on what one means by civilization. Certainly modern luxuries are not the Alpha and Omega of it, nor do we remember Plato and Shakespeare as sybarites. Mr. Russell, with many of his fellows, sees modern working conditions as static and monotonous; Dr. Kallen sees them as mobile, cohesive, and coöperative. Human values, as Mr. Russell himself has observed, reside in the relations of human beings one to another.

XI

It is true that the machine tender suffers from factory noises and rhythms; it is true that nearly every workman lacks the mental and spiritual resources to take full advantage of the leisure implicit in the five-day week and the eight-hour day. He is too busy when off duty seeing motion pictures, listening to the radio and gadding aimlessly in an automobile "to cultivate his immortal soul," as Arnold Bennett put it in *How to Live Twenty-four Hours a Day.* Yet neither in suffering from noise nor in failing to take advantage of his leisure is the laborer in worse case, as a rule, than his employer. All Americans, it may be said, suffer in some degree from these evils, both of which are remediable.

By and large, even from so cursory a survey as this, we must conclude that labor's lot during recent years of heightened mechanical civilization is far preferable to the conditions prevailing at other times and places. It may be conceded readily enough that Australia offers to the workingman better laws than does the United States, and greater protection in the security of his employment, but one still may question whether all the circumstances of that country are more desirable. In the discussions of the Machine Age this machine-made toiler has taken the forefront of consideration. Pity has been lavished upon him without stint by the sentimental, and in many instances he has merited it. In times past he has deserved even greater compassion. To-day he stands to share with the whole population in the blessings which may accrue from an intelligent course in meeting and solving the puzzles which the times present.



CHAPTER SEVENTEEN

EDUCATION: From Illiteracy to the Public School

I

WILLIAM MARION REEDY once told me he thought all the writers about supermen lisped. Fancy the surprise of this literary pontiff, were he alive, to learn that certain scientists of the Machine Age now propose to make supermen of all Americans. Dr. Oscar Riddle of the Carnegie Institute at Washington, who is one of them, foresees a people of greater height, immune from most diseases, superior in intellect, longer lived and endowed with control of their children's sex. As to the last-named attribute, Dr. Riddle reminds us that the sex of lower animals can be regulated now.

Nothing any scientist advances can be dismissed with incredulity or derision. The scientist himself is moving in new worlds. What were accepted a generation ago as immutable laws are seen now to be discredited theories. Even within the last ten years there have been revolutions in physics, chemistry, and psychology; relativity and the quantum theory have brought a new conception of the "material" world, and the addition of a few cubits to men's stature does not now seem so impossible as it must have seemed to our fundamentalist Bible-reading grandfathers.

"So great may be the change," says Dr. Riddle, "in the physical and intellectual life of man a century hence that it is very hazardous for any person to try and draw a good picture of it. Probably the supreme result of the application of the power of developmental control among men would rest on the transformation it can bring to the mental outlook of man. That transformed outlook would be more important to the human race than even a release from pain or disease, greater physical and mental strength, the greater length of life or the more desirable type or degree of the multitudes of characteristics which a successful application of the new knowledge of the control of human development would give them.

"Ignorance may never disappear. But myth and superstition will not commonly survive a wide application of that kind of knowledge which controls and transforms human capacities. When on man himself is exercised the power which has already been used on animals, the mind of man will not only grow, it will find freedom."

Not from the laboratory alone, obviously, but from the classroom as well, is this transmogrification to come, if it does come. Against so heartening a picture, however, must be set the common assertion that, even as we are (with an average intelligence equivalent to that of a fourteen-year-old child), we are "overproducing brains," and fitting more persons for superior work than the machine economy can take care of. A New York banker has told Princeton students that, excepting for courses in debating, their four years at the university are practically wasted so far as business life is concerned, and are good for nothing but the law, science and engineering. The young man entering business at eighteen had a far better chance, he averred, than the young man of twenty-two, even with his diploma. I suspect that the banker may have overstated his case. Once I talked with the sons of two Wall Street magnates while they were at Harvard, and their complaint was that most university undergraduates were less interested in an education than in making personal and social contacts which would serve them well later, in business life. Nor can one accept without qualification the banker's assumption that college-bred men have "lazy habits of thinking," that the life is too soft and easy.

The banker's reference to professional—non-business—pursuits, nevertheless, is pertinent to the averments of pessimists who find that we are fitting about one and one-quarter million persons annually for the law, medicine, engineering and science whereas these fields offer opportunities, according to their statistics, for only about 175,000 such students. It is noted, although the connection is not readily apparent, that in manufacturing but one high executive is needed for a thousand workers, and that Henry Ford uses but one for five or ten thousand workers. Just what this has to do with the professions is dubious, but our pessimists declare that there is suitable work for only about one out of seven of the "fine minds" our colleges and universities are turning loose upon the world. This is called "the mass production of Best Minds," and "overproducing brains."

The charge of mass production and standardization is commonly brought against our schools and higher institutions of learning. With this we shall deal a little later. For the present we may question whether it is possible to "overproduce" higher mentalities. Hamilton Holt, president of Rollins College, expresses a view quite commonly held when he denies that this is possible. "Psychologists are now substantially agreed," he observes—although not in discussing the pessimistic view, but another—"that the quality of intellect with which one is born does not materially change through life. If this be so, then the boy who enters Rollins with, for instance, a third-rate mind cannot be graduated with a second-rate, to say nothing of a first-rate, mind." The college faculty does not produce brains any more than the football coach creates muscle. Both train and direct the raw material, mental or physical, which comes their way. If they succeed in engendering a continuing curiosity about the strangeness of the world we live in, we may achieve that "transformed outlook" of which Dr. Riddle speaks so enthusiastically.

II

If mere investment of money be accepted as a certificate of faith, then there is abundance of evidence to offset the common American disparagement of our whole scholastic system. Visitors to our shores, as a fact, commonly say that the acquisition of education is a sort of religion with us. Just before the World War, our per capita outgo for school children was $38 annually. By 1916 the figure had increased to $50, and ten years later it passed $100. These figures apply to the grade schools. The increases for high schools came later. In 1890 we had about one-third of a million high school students, whereas in 1928 we had more than four and one-half millions. We have now more students in colleges and universities than all the rest of the world. Consider, then, some further figures.

Between 1890 and 1920, the cost of elementary and secondary schools mounted from less than $150,000,000 a year to more than a billion. This was a seven-fold increase, to be set against a doubling of the number of pupils. From 1910 to 1920 the per capita cost of education (figured in outgo of taxes) rose from $4.62 to $9.90. In the decade after 1913, the expense of public education rose from half a billion dollars to more than thrice that sum. It is now well above two billions for twenty-odd million pupils. During this century the pay of teachers has increased by 140 per cent. And three billions of dollars—about one-seventh of the national debt—are urgently needed for school buildings. As for higher education, private endowments and incomes from them supply a much larger annual sum than either the contributions from city, State and Federal governments, or the somewhat smaller aggregate paid by students themselves for tuition, board and lodging.

Increases in the number of pupils and teachers do not account for all of this swollen outgo. Courses of study have been enlarged, to embrace in particular woodworking, drawing, machine-shop practice, pattern-making, foundry work, book-keeping, typing, stenography, economics, commercial law, secretarial work, dress-making and millinery, salesmanship. (Here the Machine Age rears its head; the study of Greek has all but disappeared.) We have better buildings now, larger administrative staffs, elaborate intelligence tests and systems of reporting progress, by class and pupil, pension systems for teachers, and the increasing use of schools as centers of community activities and interests. The whole process of education, in the public system at least, has been augmented and intensified.

The examinations under the draft showed that about one-fourth of the men entering the military forces of the United States were "practically" illiterate. (There seems to be no settled definition of illiteracy in common use.) The general percentage of illiteracy now is rated at Washington, for the whole population, at six. This is a vast improvement over about twenty-five per cent. in 1917 for such as were tested.

III

What is a successful education? What are the essentials of that schooling with which, in this country, dissatisfaction is so commonly expressed? Some two thousand years ago Aristotle thought that the chief end of it was preparation for the right use of leisure. He was thinking, however, of the favored few, not of such masses as we undertake to educate. Dr. Everett Dean Martin of the People's Institute in New York City says that a liberal education should set up a civilization in which a Socrates would be at home. President Emeritus Charles F. Thwing of Western Reserve University goes into the question somewhat more at length.

> The principle seems to me [he says] to be the salvation, or the complete health, of the individual and the State. Under the application of this principle, the essentials in education include, first, whatever ministers most fully to the integrity, in body and mind, of the individual citizen; second, whatever most directly aids his usefulness as a citizen; third, that which most completely helps him in adjusting himself to the unchanging laws of nature, and to using these laws for his own and the common benefit; fourth, whatever most adequately contributes to his loyalty as a child of God. Whatever condition, therefore, or force, serves to give these four great results is an essential of education.

In the modern American school it is usually thought as important to teach a student how to make a living as how to live, but there has been a deal of criticism of the methods used in vocational education. President Henry S. Pritchett of the Carnegie Foundation for the Advancement of Teaching, for example, says:

> The public school makes its greatest contribution to training in the crafts when it teaches boys and girls in the elementary schools to do such

work there as will give them the discipline of mind and the accuracy of knowledge necessary to enter a skilled craft. The greatest service the elementary school can do for the boy who wants to be a carpenter, or a mason, or a machinist, or an electrician, or a printer, or a glazier, will not be accomplished by trying to teach him something about any of these skilled trades. It will do the greatest possible service for him if it sees to it that he knows the English language well, that he can reason in terms of his elementary mathematics with sharpness and accuracy, that he understands the fundamental principles upon which his Government rests, and that he has acquired in the process of his elementary education that thoroughness of knowledge in these simple subjects and that ability to turn his mind to one problem or another which will qualify him to go into a trade school and to do its work so well that the trade school will not have to teach him English and elementary mathematics. With the best intentions on the part of those who originated these courses, the introduction of vocational training into the high school has in a considerable measure served only to lead men away from those high and honorable vocations which find expression in a sincere and accurate craftsmanship and to entice them into occupations that are already overcrowded and that play a small rôle in the work of production.

A good part of the increased cost of education arises from the very practice to which Dr. Pritchett objects. Work benches, tools and the other equipment needed to convert elementary and high schools into trade schools have been installed at considerable expense without conferring those advantages, if Dr. Pritchett be right, which best fit the student for a livelihood in the Machine Age.

Both Dr. Thwing and Dr. Pritchett, it may be noted in passing, dwell upon the schools as incubators of good citizenship. Dr. Thwing goes further, and would have the pupil acquire approved religious beliefs. The public school system, indeed, is the basis of that security and solidity in American institutions which, to visitors, is a constant cause of amazement. When President Hoover instructed his National Law Enforcement Commission that "the preservation of our institutions" depended on obedience to State and Federal statutes, he gave (undoubtedly with no such intention) a quite exaggerated impression of anarchism. We are a restless and a reckless people, and our crimes of violence do exceed in number those committed in any other country. But American institutions are sounder and safer to-day than governmental institutions anywhere else in the world. Nowhere else could the soap-box agitator be permitted to spout with greater general security; that he is often silenced here is due, perhaps, to the fact that our schools have somewhat overtrained their students in "citizenship."

Citizenship, as taught in our schools, consists in the faithful emulation of the successful and dominant type. It is this, in part, which gives rise to the charge of standardization. Horace M. Kallen, in *Education, The Machine, and the Worker*, says: "To the banker, the packer, the oil or steel or copper magnate, the newspaper and magazine owner, the tool manufacturer, the railroad director, the chewing gum or patent medicine fabricator or real estate operator, culture becomes a mirror held up to their own natures, reproducing them as they think they are. It is a collection of flattering portraits with which they decorate the house of life in the United States, that recur in all their infinite and unwitherable variety in the arts and letters, the motion picture, the stage, the newspaper, the magazine, and above all, the school. Education becomes culturally sterile, a process of self-repetition of the dominant social type, the instrument of reproduction without variation." Dr. Kallen thinks that our schools "ease" pupils into becoming cogs in the industrial machine and enable government, "both visible and invisible," to continue by consent, by inhibiting the technique of doubt and dissent.

IV

Bertrand Russell says that "the positive emotion which should supply the motive in education is curiosity, but the curiosity of the young is severely repressed in many directions, sexual, theological and political." This differs somewhat from Dr. Kallen's complaint of the inhibition of dissent. "Instead of being encouraged," says Mr. Russell, "in the practice of free inquiry, they are instructed in an orthodoxy, with the result that unfamiliar ideas inspire them with terror rather than with interest."

He does not lay this condition at the door of the Machine Age, of course; indeed, most of us will agree that children are less constricted nowadays in their acquaintance with the subjects he names. I know a charming girl, in her late 'teens, who quite gravely gave her grandmother a copy of *Ladies in Hades*, a distinctly smutty book. But in reply to Mr. Russell it may be as well to quote another Englishman, Aldous Huxley: "When the contemporary child takes a normal, healthy interest in sex and such matters, the majority of young parents do not weep over him, or beat him, or tell him that his soul will roast in hell-fire. It follows therefore that his future reactions to sex will be less violently painful than the reactions of those who were children in the high old days of Podsnapian respectability."

No, modern children are not so severely regimented at home as were their parents, but at school and college they are coming more and more under the influence, whether good or bad, of a mechanized civilization. In 1928 and 1929 New York State added fifteen new buildings to her schools, to be devoted to industrial education, and provided shops in fifty other new school buildings. Michigan established workshops in fifty-five new school buildings, and many other States followed suit, although not to the same extent. When we reflect that during the last generation, while the population of this country was increasing about eighty-six per cent., the public school enrollment was increasing considerably more than one thousand per cent., we perceive how widespread is this influence.

Some small town high schools draft local industries to assist in machine instruction. The Federal Bureau of Education reports that a harvester machinery company supplies a foreman as instructor in foundry practice, while in another city courses in power-plant engineering, laundry work and linotype operation are conducted in coöperation with local industries; and still another, in the Indiana stone quarry region, gives courses in stone drafting and the production of building material with local industry to supply the mill and other equipment. Aviation, being distinctively a pursuit of the modern man, is taught in some schools, with instruction about airplane engines and automobile mechanics. New Jersey is teaching pupils radio production and service.

The radio and the motion picture themselves have come conspicuously into the scheme of public education. Visual instruction through these means, and through graphs, stereopticons, stepographs, and similar devices are commonplace. It is asserted that school buildings are not now considered properly equipped unless they have one or more motion picture machines; many city institutions are supplied with radio receiving sets, and others are installing them. Moreover, administrative staffs are modeled on the basis of Big Business enterprises.

Even so, the National Industrial Conference Board laments that education is not tied more closely to jobs. It reports that "some maladjustment has come into existence as between the present public educational system and the conditions under which most young persons must begin to earn their living." Educators themselves, the Board observes with grief, lack in many cases a practical knowledge of business life.

Nor is this the only instance of maladjustment. The evil appears to be almost as prevalent in the school room as in the factory. Unfit candidates are seeking degrees, although it is admitted by the pedagogues who make this criticism that "society as well as scholarship has its claims upon a university." Truancy, which leads to crime, so it is said, is usually the result of being misfit in school. (Industrially, maladjustment is also held responsible for crime, as we have seen.) The logic, standards and commercialization of the Machine Age are increasingly influential, it is apparent, in our educational processes. Even the higher institutions of learning acknowledge them with courses in salesmanship, accounting, business administration and so on. These are becoming more and more conspicuous in our universities.

As for truancy and resultant crime, our most up-to-date pedagogues consider them not so much a by-product of a wicked Machine Age as a heritage from pious ancestors. Hear, for example, Dr. Meta L. Anderson, an instructor in psychology at

New York University and a director of the Binet schools at Newark:

> It has long been the fashion to ascribe American success and whatever there is of stanchness and God-fearing qualities in the American character to our Puritan ancestors, who believed that moral muscles were strengthened by denial, and that the way to earthly achievements and heavenly salvation lay through unhappiness and a worm-of-the-dust scale of personal appraisement.
>
> How great, then, would be the indignation of these stern forbears if they knew that principles of education such as they believed in are now held largely responsible, not for our virtues, but for our vices; for the spirit of lawlessness so rampant to-day and for the actual "crime wave" of which we hear so much!
>
> Our songs grow sentimental about the little red schoolhouse; yet the system of teaching for which it stood, and for which most of its successors still stand, is now recognized by psychiatrists as one of the major causes of criminality. It is also judged guilty of adding to the appallingly large population of our mental hospitals—a population as large as all the country's other hospitals combined.

The Little Red Schoolhouse is the model, so Dr. Anderson believes, of our public school system to-day, although it is not of record that machine instruction was given there. Dr. Joseph Eckel of Buffalo, however, agrees with her condemnation of the educational system as a cause of nervous and mental diseases. "There is a great need for revision of our current methods of teaching," he concludes. Dr. Anderson blames the public schools, further, for the great number of "retarded" pupils who repeat the same grades year after year. In Philadelphia, she says, it costs an average of $42.29 annually to put a pupil through the schools, and she adds that in 1928, 32,000 retarded pupils cost the city's taxpayers $1,353,000. "How long," she inquires, "will the taxpayer be willing to invest his money in a business run so wastefully?"

V

The "revision" to which Dr. Eckel alluded was about to take the form, according to an announcement at Teachers College, Columbia University, of deleting or debunking the fairy stories in which children delight. No longer was the cow to jump over the moon or the three little pigs to go to market. No longer were Little Red Riding Hood and Jack and the Beanstalk associations to delude the young mind. Even the alphabet books were to be revised according to pragmatic standards; no longer was "A" to stand for tempting "apple pie"; it was to connote an adding machine or axle or some similar utility. "We must do away," it was said, "with the sentimental in child literature. We must remove from the nursery and the kindergarten those utterly ridiculous fairy stories in which animals and birds are endowed with human qualities and talk like human beings." The three little pigs and their friends might lead to a preference for Henty and Zane Grey, it was feared; the child should have in its literary provender the equivalent of spinach and turnips.

One recalls Charles Lamb's righteous wrath when a certain Mrs. Barbauld, who objected to "The Ancient Mariner" because she perceived it was improbable, attempted some such debunking —although the word was not then known—in his day. "I am glad," he wrote Coleridge, "the snuff and Pi-pos's books please. 'Goody Two Shoes' is almost out of print. Mrs. Barbauld's stuff has banished all the old classics of the nursery. . . . Knowledge insignificant and vapid as Mrs. B's books convey, it seems, must come to a child *in the shape of knowledge*, and his empty noddle must be turned with conceit of his own powers when he has learnt that a Horse is an animal, and Billy is better than a Horse, and such like instead of that beautiful interest in wild tales which made the child a man, while all the time he suspected himself to be no bigger than a child. Science has succeeded to poetry no less in the little walks of children than with men. Is there no possibility of averting this sore evil? Think what you would have been now, if instead of being fed with Tales and old wives' fables in childhood, you had been crammed with geography and natural history!

"Damn them! I mean the cursed Barbauld Crew, those Blights and Blasts of all that is Human in man and child."

It was not often that the Prince of Humorists expressed himself so emphatically and profanely. It would be refreshing, could he be resurrected, to hear what he would say of the American plan to rationalize child literature.

This plan to censor Æsop and Grimm and Andersen and Mother Goose, and to eviscerate youthful imaginings, did not meet with the thundering applause which Teachers College apparently expected. Instead there was an unmistakable outcry against it. Teachers could wait at least until high school and college before they began standardizing and depersonalizing their classes. Let there remain to the infant whatever tendency toward individuality and originality as might bless it. Thus Teachers College disavowed its program, or the greater part of it. But children should still be taught, it was maintained, that "A" is for airplane and "D" is for derrick and "Z" is for Zeppelin. Alphabetic associations should be made to conform to the Machine Age.

VI

The modern influence apparent at Teachers College in New York City is making its way much more slowly in the southern States. The President of the University of North Carolina, an institution greatly enriched through benefactions founded on the mechanization of tobacco factory processes, asserted that the South must adjust itself to a world "that has been brought into being by science and industry, that reckons efficiency and achievement above personality, that exalts work rather than leisure, that thinks of groups and organizations more often than it does of individuals." Southern habits and traditions, he admitted, opposed such ideals, and must accommodate themselves to change. Already, I may say on the basis of my own observation, some southern colleges have adopted the strictly modern viewpoint regarding sports.

In regard to college sports, the Carnegie Foundation for the Advancement of Teaching made public, in the Fall of 1929, a report of the first exhaustive inquiry made in that field. During three and a half years agents of the foundation had visited one hundred and thirty universities, colleges, and secondary schools, and the report called the subsidization of athletes "the darkest blot upon American college sport." The alumni, teachers, and administrative officers who encouraged this condition were called "the Fagins of American sport and higher education." It was asserted that one out of every seven engaged in intercollegiate competition was subsidized to a point "bordering upon professionalism."

The two fundamental causes of this situation, according to the report, were the commercialization of college sports and "a negligent attitude toward the educational opportunity for which the American college exists." Instead of regarding these forces as coördinate factors, might it not be logical to accept the two as cause and effect? It is difficult to reconcile collegiate commercialization with ardor for the humanities and the classics, although it goes along well enough with a "retail forum" at New York University and kindred courses elsewhere. These assist in the acquisition of facts, but are hardly suited to that spirit of intellectual inquiry and effective dissent which colleges might engender. The commercialization of sports, obviously, is influenced by, if not directly a consequence of, a mechanized world.

The Carnegie report, as was to be expected, brought forth from many educational centers strong denial or dispute. Some bystanders thought they did protest too much. Higher institutions as well as the high schools from which they recruited their athletes had found winning football teams and track squads useful for publicity and salesmanship. Some newspapers admitted their share of the blame, because the disproportionate space they accorded to college competitions, in stories, pictures and "expert" opinion, solely in the hope of fattening circulation and exacting a higher advertising rate, had given students an exaggerated notion of their own importance and the importance of athletics in the scheme of things. It had substituted for the old campus ideal of play for play's sake a businesslike appraisal of the financial returns from championships. Thus injury was worked on the health, mentality, and character of successful athletes. It was a condition readily remediable, because subsidies, professionalism, commercialization and press-agenting are not indispensables of college competition. There was hope in some quarters that the outspoken Carnegie report would shame promoters of these conditions into mere sensible and less dangerous practices.

VII

That we may put education into some sort of perspective, let us glance back briefly over its history. Its beginning, clearly, was in the home, and anthropologists assure us that for centuries there was no attempt at improvement from generation to generation, a complaint akin to Dr. Kallen's about modern public schools. Primitive man seems to have been fairly satisfied with himself, too. The earliest schools were to train priests, who were to supplant diviners and prestidigitators. For a long time learning was a monopoly of the clergy, but it became a monopoly in which the aristocracy shared, when the priesthood lost complete dominance of affairs. In Greece the Senate, the forum, and the palæstra of Socrates served educational purposes, but for the ruling classes, who were the wealthy. Plato wrote the first textbook on schooling.

During the Middle Ages there were two systems of education, one to teach the young monk, the other to prepare the young knight. In the clerical schools the notion took root that learning must be repulsive *per se*, that ease and pleasure were incompatible with mental advancement. That notion, and the subjects taught with it in view—grammar, dialectics, rhetoric, music, arithmetic, geometry, and astronomy—had their distinct effect on modern systems.

Rousseau, revolting against the false civilization he saw around him in 1762, published his *Émile*, which greatly affected, by its demand for the study of nature and its derision of social shams, educational processes thereafter. He was followed by a host of writers and theorizers too numerous to set down their names here, with notes on the views set forth. The colonists of this country, however, continued the old tradition that education was a monopoly of the pious and the rich. The distinction between "gentle folk" and their inferiors was maintained even in dress; and when Massachusetts and Connecticut established a feeble beginning of public education, it was the understanding that those meanly and ungently reared got their three R's as gratuities from the well-to-do. It was a sort of charity, but was dispensed somewhat earlier and more readily than the right to vote. Midwestern States, in which the demand was more clamorous for equal rights, equal schooling and equal suffrage, did much to reduce the prestige and privileges of our early "upper" classes. It was not until 1830 that there was a public school system even modestly worthy of the name; by that time the suffrage had been extended, excepting in Rhode Island and Virginia, to mere workers. The newspapers (strangely, for one might suppose that they would have sought the spread of literacy) opposed schooling for the masses. "The peasant must labor," said the *National Gazette* of Philadelphia, "during those hours of the day which his wealthy neighbor can give to abstract culture of his mind; otherwise, the earth would not yield enough for the subsistence of all: the mechanic cannot abandon the operations of his trade for general studies; . . . languor, decay, poverty, discontent would soon be visible among all classes." This was the prevailing editorial point of view.

Certainly in its earlier stages the machine worked havoc for the laborer and for his offspring. A committee of the Massachusetts Legislature reported in 1825 that it had found only two towns in the State where children from six to seventeen years old worked as little as eleven hours a day; elsewhere they worked twelve and thirteen hours. They had no time nor energy for schooling; and even if they had, they were excluded from the better institutions. Yet their parents there and in other States were insisting that since "our government is republican, our education should be equally so." By 1871 we were spending seventy millions in a year on public schools; by the end of the century the amount has risen to two hundred millions. There was an increasing demand for the practical and mechanical in education, and the old ideals of a liberal education became obsolescent.

Business came to be regarded as a "profession." The growth of natural science as a collegiate course, in harmony with the Machine Age, accelerated the tendency. Physics and chemistry assumed greater importance, and undergraduates began to value more highly, for social and business purposes, their campus and classroom acquaintances. "The degree of Harvard College," a student told Henry Adams, "is worth money to me in Chicago." This could hardly have been agreeable to the man whose story of his own education is one of the great contributions to literature, and who once said to another class, while teaching at Harvard: "We can found no philosophy on the observation of four hundred years, excluding three thousand. I am Professor of History but I pride myself that I never remember a date." What he attempted to do was to relate events to causes without special regard to the calendar. Yet he lived to see machine industry demanding a type of education which only technical and business schools could supply.

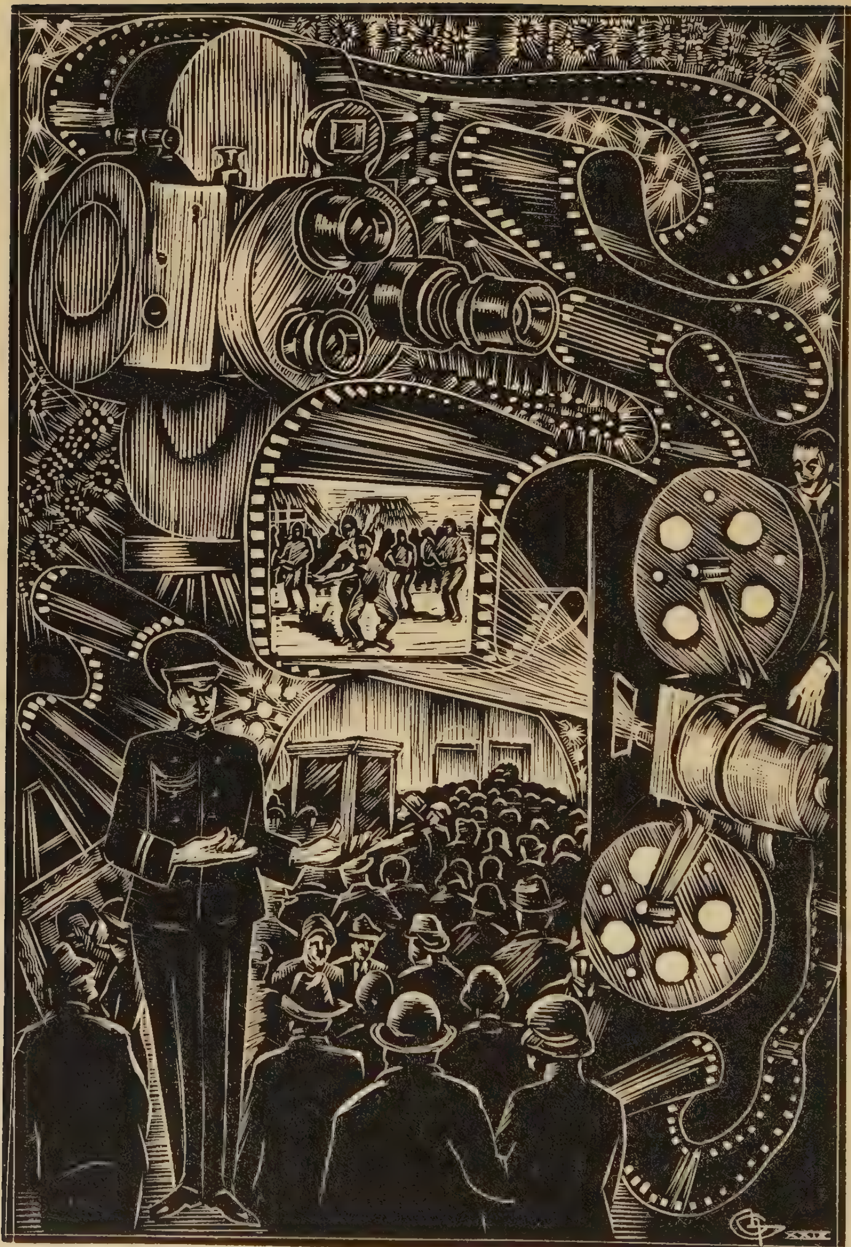
For long women were quite excluded from higher education. In 1833 Oberlin College took the revolutionary step of offering its opportunities to the female of the species, but it was twenty years before Antioch followed suit. State universities in the North and West were hospitable to the innovation, and private institutions emulated them. Vassar College, for women exclusively, was not founded until 1865, and Cornell did not become coeducational until 1872, Chicago University until 1892.

VIII

Despite Chicago's tardiness in this step, that city witnessed the beginning, in the early 'fifties of the last century, of the modern pedagogy which relates education more closely to living. Irwin Edman, in the *New York Times* magazine section, once attributed this new method to Dr. John Dewey, whereas the fact is that it was inaugurated by Colonel Francis Wayland Parker thirty years before Dr. Dewey began teaching. Dr. Dewey would be the last man to want credit not due him, and Mr. Edman, who is an instructor in Dr. Dewey's department at Columbia, was singularly misinformed. As a fact, Colonel Parker's work inspired one of the early benefactions from the rich to our educational institutions. Mrs. Emmons Blaine, an admirer of his methods, endowed with a million dollars a school in which, for a time, he carried on.

Such benefactions are a distinction of the later Machine Age. Aside from the huge sums set aside by the Federal, State and municipal governments, and aside from the donations made privately every year for buildings, stadiums, the endowment of new chairs and similar purposes, there are fifteen foundations functioning continuously, which disburse every year many millions of dollars for educational purposes. This rich stream flows indirectly from the factory, the forge, the mine, mill and shop. It is made possible by the unprecedented wealth the Machine Age has bestowed upon this country.

Whether mental disturbances and the "crime wave" are due solely to our schools, as some aver, or may be due in part to the nervous tension of modern life, is open to question. There can be no question that shorter hours of work, higher earning capacities, and readier access to the school system, have brought to the people of the United States during the last half century educational advantages such as no other people in the world, probably, enjoy. Callisthenes said that a man who had ceased to learn had ceased to live. None need cease to live in that sense in this land, with the increasing attention which is being paid to adult education. The Machine Age has given us the time and the facilities to enjoy a civilization "in which Socrates could be at home." It remains to be seen whether, as a people, we are capable of taking the full fruit of our future. If we fail, surely it would be cowardly to blame the machine alone.


MOTION PICTURES

CHAPTER EIGHTEEN

ENTERTAINMENT: From Desert Dance to "Talkie"

I

THEODORE ROOSEVELT, while President, was invited by a Washington acquaintance to attend a Big League baseball game.

"What!" the Colonel exploded. "Do you expect me to sit still for two hours and watch somebody else doing things?" He had been an active participant in a crowded life; never, if it could be avoided, a passive spectator. His son and namesake, when a member of the Harding Administration, kept himself fit playing basketball and squash. Herbert Hoover has witnessed a World Series baseball game, and attended, during his first year in the White House, a football match, but he can hardly be called a "devotee" of that kind of thing, despite the fact that his most enthusiastic partisan, the *Herald Tribune*, so designates him. He is fond of throwing the medicine ball, fishing, hunting, and other outdoor sports.

It is true that this country provides audiences of sixty-five thousand for baseball games and seventy-five thousand for football games, and even larger gatherings for commercial prize fights. But the common charge that we have become solely a by-standing race at athletic contests is too sweeping to be quite true. Our young men, some of them, jump higher, hit harder, put the shot farther and run faster than their forbears. They run faster than the legendary Greek who took the news of victory from Marathon to Athens. They ride polo ponies, on occasion, like Centaurs. Their sisters compete with them on the tennis court and the golf course. Both sexes swim the English Channel, whereas only Leander swam the Hellespont and Hero didn't even try. Whosoever says the machine, by lifting muscular drudgery from our shoulders, has bred a race of weaklings, is entitled to another guess.

Diversification of amusement and its commercialization are characteristic of our time. About four millions of us play golf, a million tennis. Twelve millions go to baseball games during the season, and twice as many to see football matches. In a single bowling tournament in Chicago there were fifteen thousand entries. Motion picture magnates assert that they sell tickets to seat the entire population of the United States in the course of eight or nine days. It is easy to see that "spectatoritis," a word invented to describe a symptom of Machine Age temperament, prevails with a larger number than active participation; but the statistics I have quoted take no account of handball, swimming, dancing, and other diversions, unorganized for the most part, which afford opportunity for physical exercise.

William James noted that Norwegian women, when they left the fireside for the ski, became "lithe and audacious creatures . . . actually taking the lead in every educational and social reform." Our most eminent philosopher and psychologist was interested, naturally, in the relation of a sound physique to character and society. In the United States the girls whose mothers played pianos, in the day when a sentimental ballad might sell more than a million copies, have given the music teacher the go-by for the open air, when not listening to a radio broadcast. Not grand pianos but automobiles, tennis rackets, and golf clubs are the tests of family standards and financial solidity.

II

No one accused the Romans of being weaklings, yet Pliny tells us that the Circus Maximus seated 250,000, and other writers have put the figure as high as 480,000. Even Madison Square Garden, under the dubious policy inaugurated by "Tex" Rickard, can harbor no such mass of spectators, even for a rodeo. It is true that only 45,000 Greeks could be accommodated at Olympia, whereas more than 100,000 paid two million dollars to see James J. Tunney whip a second-rate pugilist at Philadelphia; and the stadium at Athens has been estimated as seating from 47,000 to 69,000, whereas California has a stadium which will seat 100,000, and the Yale Bowl accommodates 80,000.

Ancient dances and games had their origin in religious ritual and observances, like theatrical entertainment. As they passed to secular uses, they were employed to celebrate martial victories and the triumphs of the chase. The dances of the desert tribes often expressed sexual passion, and were more suggestive than the turkey trot, the Black Bottom, or the fox trot. It is a coincidence that we of the Machine Age should introduce the fox to our dancing floors, for primitive peoples did something of the sort. The Ostyak tribes in northern Asia imitated the play of the wolf and the bear, the Kamchadales the antics of dogs and birds. On the Congo, hunters, before setting out, dance in imitation of the gorilla; the Damara dance, moreover, represents the movements of oxen and sheep, and the canter of the baboon. In Borneo the Kennowitz have a like fondness for the deer, the Tasmanians simulate the frog and kangaroo, and the Gonds the kangaroo. If our modern dances offend the Watch and Ward Society and kindred organizations, we may recall that the waltz, which they approve, so shocked Lord Byron (himself something of a rake), when first he saw it, that he left the hall in anger and disgust. The dancing worshipers of Bacchus and Cybele worked themselves into a sort of madness, and the music which accompanied them, as well as dancers elsewhere, was more barbaric and provocative than modern jazz.

A master of jazz orchestras has called jazz the music of the Machine Age. The moan of the saxophone, the wails and shrieks of the other instruments, the broken rhythms, are indeed as reminiscent of the factory as baseball is indigenous to the United States. The new compositions, although derided by classical scholars as a mere return to the tom-tom of the jungle, swept through Europe and the Far East, justifying themselves by a world conquest. Jazz was more than a fad; it ran from wild primitive notes out of the soil to variations of ancient themes, and was acknowledged in time to be an authentic expression of its era. If the steps danced to its accompaniment lacked the stateliness of the Colonial minuet, who shall say that they were on that account more wicked. Even vice may be dignified, in its way, and the hoyden is not necessarily a wanton.

III

Homer, in the twenty-third Iliad, has given us the first record of ancient games, and they were played at the funeral of Patroclus, in the belief that the dead would be gratified at exhibitions which had pleased them in life. The Aryans handed down the bases on which were founded boxing, archery, running, the chariot race, wrestling and putting the discus. In such games were medieval candidates for knighthood trained. Archeologists agree that the Greek games, perhaps the noblest of antiquity, did much to mold the national character and to promote physical as well as intellectual improvement. Just before they began, heralds proclaimed a truce, which put an end to all warfare while they continued; and they were attended not only by the nobility but by the poets and artists who found them a chief source of inspiration. Alcibiades, the Harry Payne Whitney of his day, was said to have entered seven chariots during one session at Olympia. Famous scholars delighted in these occasions, and it is of record that the Sophist, Hippias, when attending one of them, boasted that all he had about him, from his sandals to his garments and the dithyrambs he carried, were of his own manufacture. Greek athletes, it is worth remembering, were required to produce witnesses who swore that there was no stain of any sort upon their characters. What havoc such an oath would work on modern sport, no less than on some of its chroniclers.

The Roman games descended far from the Greek ideal, and the Circus Maximus was called the ignoblest of the old amphitheaters, its gladiatorial combats the forerunners of Spanish bull-fights. Professionalism was common, and even paid athletes were rewarded and adored even as are subsidized college stars to-day. Spectators esteemed the combats as offering special opportunities for gallantries and gambling. Spartacus, inciting a band of gladiators to revolt, spoke with fierce derision of the perfumed aristocrats who had bet sesterces upon their blood. Gambling, however, has been associated with games ever since, and is as often called gaming. Efforts to prohibit it are seldom entirely successful. In England the Puritans objected not only to wagers but to sports themselves; and in 1617 James I laid the groundwork for a prolonged controversy when he issued formal permission for dancing, archery, leaping, pole vaulting and such amusements, "without impediment or neglect of divine services." The same voluminous decree held that it was no sin for women to carry rushes to church for decorative purposes. However, bear- and bull-baiting and bowling were forbidden altogether on Sundays.

Most of the ancient games have come down to us with some modifications, but baseball, which is supposed to have supplanted draw poker as our national pastime, is credited to the inventiveness of Major General Abner Doubleday, who laid out a diamond in 1839 at Cooperstown, New York. The game, however, is supposed to have been an offshoot of the old English game of rounders. Since then many changes have been made, not only in rules but in the size and weight of the ball. Of late years, fed on the superficial emotions, fed largely by newspaper sport sections, there has been a more insistent demand for slugging on the ball-field, just as there has been a demand for a different sort of slugging in the prize-ring. Formerly, when the sport was in its heyday, unsmirched by scandal in spite of its professional nature, it was thought at its highest point when it resolved itself into a subtle contest between two superb pitchers. The more skillful and courageous of these men were national heroes. Then more and more rubber was put into the ball, that we might have as substitute heroes such men as "Babe" Ruth and Melvin Ott. The swinging bat and accurate eye supplanted in popular favor what had been the fine art of the pitcher's box. Home runs became the basis of eight-column newspaper headlines, and the dignified *New York Times* declared editorially, with every appearance of seriousness, that Ruth "wears the laurel amid the deafening plaudits of the American nation" because he had knocked three home runs in a World Series game. This newspaper and the other dailies in the United States, almost without exception, have devoted to Ruth (as to other paid stars of the screen, night club, swimming contest and "squared circle") many times as much space as they have accorded to any philanthropist, educator, scientist or public official, however noteworthy his deeds.

IV

The effect of the machine on national amusements was first made manifest in outdoor sports. Even the rodeo, which is indigenous to this country, has been commercialized, although but recently. It began in competitions of horsemanship between cowboys on the western plains, and was distinctly amateur for many years. As time went on the sport was augmented to include lariat throwing, bull-dogging and racing. Effete eastern travelers, returning from trips to the Coast during which they had chanced to witness these spectacles, gave enthusiastic reports of them; and promoters, alert to capitalize thrills of any kind, formed a sort of super-vaudeville circuit through large cities east of the Mississippi River, and employed large troupes annually to provide entertainment for the pallid and sedentary worker. Thus a hundred cowboys and a dozen or more cowgirls —"women riders," the newspapers called them—giving "an exciting exhibition of broncho-busting, trick riding, bull-dogging and roping in which several riders narrowly escaped injury." Crowds of ten thousand exhibit their delight at steer wrestling and calf-roping. And two Mexican bullfighters, perhaps merely in the hope of stimulating an appetite for the barbaric sport of Spain, wave cloths, dodging nimbly, in front of angry bulls.

We are a suggestible people, and the daily press has been successful in creating factitious appetites and maintaining them. In many instances its sports writers, as is commonly known, are venal. It is a little difficult, however, to understand why substantial parts of the populations of large cities should become partisans of hired baseball teams, even to the point of assaulting an umpire for an adverse decision. It is the more difficult to understand when one knows that these paid players are subject to exchange, under acceptable financial conditions, from one "nine" to another, and that some of them have been found guilty, to public knowledge, of grossly and corruptly cheating the public for their own enrichment.

This becomes less mysterious, however, when one contemplates the situation in regard to boxing. This is a sport by no means so brutal as intercollegiate football, and it has the merit of beneficial influence on its spectators, instead of inflaming their passions and regimenting them under autocratic cheer-leaders. In boxing, when the matches are carried out under the accepted rules, fighters must be evenly matched as to weight, must not hit each other when one is down, must not hit save within prescribed areas, and are otherwise circumscribed in the interest of fairness. It is noteworthy that the men who are fond of watching such contests catch something of this spirit. In countries where boxing is well developed the knife, stiletto, and revolver do not flourish in the settlement of personal difficulties. And when a negro defeated a white heavyweight champion in the presence of an immense crowd, mostly white, there was no threat of violence, evidently no thought of a mob, and no charge of unfair play.

In recent years fighters whose interests formerly were competitive have become the victims of that commercialization and concentration of control which is characteristic of modern business conditions. "Tex" Rickard, who has now gone to his reward, was the chief single influence to bring about this state of affairs. As a consequence boxers under a single management, with men under the same pay in their corners, in amphitheaters owned by the same group, have pretended to put on contests solely with an eye to victory at whatever cost, although the fortune and fate of each, under rigid contractual relation, is subject to the whim of a single clique.

Public interest here, as in baseball, was shifted expertly from "the manly art" to mere slugging. For years a second-rater, who knew none of the finesse of his predecessors, but who was a slugger, and so reluctant to exhibit his muscles even in that brutish exercise that he "defended" his title chiefly by avoiding the prize ring, grew rich at the expense of a gullible American public. Even our most respected newspapers demanded a knockout before he entered the ring, and their sports writers exhausted their vocabularies in praise of him and Rickard, his manager.

Since Rickard's death there has been manifest a trend toward interesting real sportsmen in the ring, and there is the promise that its most dubious and disquieting aspects may be remedied. Unless these promises are fulfilled, a wholesome form of athletic competition must become discredited in this country.

Horse racing has receded to no such parlous state as boxing. It suffers chiefly from the activities of those who regard as immoral any wager on the outcome, and from newspapers in the opposite camp (all but about two hundred in the United States), which act as touts for the tracks, and employ so-called "experts" to guess at the winners. They do this, obviously, in the hope of building larger circulations, but their employees in many instances cannot escape the charge of being in the pay, directly or indirectly, of race-track interests. This journalistic touting, in fact, plays into the hands of those who oppose racing, and is as injurious to honest sport as to the newspapers themselves.

Only vigilant guardianship has saved tennis and golf from becoming frankly professional under modern conditions, and it has not saved all the stars of those games. But there are healthful signs of contrary influences in out-door sports. Polo is no longer the pastime of the extremely rich, although the maintenance of a stable of polo ponies must still require a well-lined purse. That is a condition which need not discredit the sport; and the severe physical training which its devotees must undergo as a daily routine involves hard and continuous work. Even in this age of the motor coach and limousine the tallyho may be seen occasionally, fox-hunting flourishes in many States, and baseball still engages small boys on corner lots. "Man's survival," cries a professor of New York University, "depends upon his participation in vigorous activities which keep alert duo-organism of body and mind." No one will deny an element of truth in this; but when the same professor asserts that "we are in the gladiatorial stage of Rome" one suspects that he is a little over-emphatic. In the introduction to the Carnegie survey of college sports, discussed at some length in the chapter on education, Dr. Henry S. Pritchett asserted that "the weakness of the American university as it exists to-day is a lack of intellectual sincerity." Noting this, the *Sportsman* says editorially:

> One must feel that "intellectual sincerity" is a truly elastic phrase. The acquiescence of a president and faculty in a system which is frankly and openly commercial, but which does not even do its business honestly, might be characterized a little more strongly than "a lack of intellectual sincerity."

As for the charge that athletics take precedence often over higher education, the editor of the *Sportsman* reminds us that Erasmus, more than four centuries ago, wrote to Luther: "Instead of holding the universities in contempt, we ought rather to endeavor to recall them to more sober studies." And that was long before the Machine Age.

Discussing newspaper notoriety and the bribery of sports writers in connection with college sports, Professor Howard J. Savage of the Carnegie staff says quite truly: "The person upon whom rests the final responsibility for a newspapers' sports policy is not the reporter, or the desk man, or the sports editor, or the editorial writer, or, indeed, the managing editor; it is the owner or publisher, who initiates or approves the policies which his employees effectuate." The owner or publisher may plead that such matters are beneath his attention, but he cannot escape responsibility either in college sports nor in any other department of his sports section.

V

More markedly the Machine Age has affected American diversions through the application of electrical principles in the conquest of the ether. If there was complaint that the talking machine was vitiating American taste through "canned" music, how much more widespread the complaint of the radio broadcast, where the listener exercises little or no individual selection. And if we are constantly being told that the theater has fallen from its high estate, how much greater the outcry against the motion picture! Both radio and the motion picture suffer, as amusements, from the same influence, an effort to reach the lowest common denominator of intelligence in their audiences. It is true that concert and opera singers are enlisted on occasion for the former, and that the screen, since the voice of the player has been synchronized with his likeness, has drawn into its service a more capable personnel. But criticism has hardly abated on that account.

Walter Damrosch, one of the first musical authorities to perceive that the radio broadcast might have useful possibilities, had achieved his eminence through conducting orchestras with audiences never larger in number than a few thousand. When he began directing music through the air he was amazed at the quantity of mail which began to reach him from unseen hearers. Thousands of letters daily were stacked upon his desk, and finally became the sole charge of a secretary. One of them, Dr. Damrosch relates with glee, came from a woman who found she had an appointment with a dentist at the very hour he was to broadcast. She would not break the engagement, but she told the dentist how great was the sacrifice she had made. Then, as she took her place in the chair, from a room adjoining came the opening strains of the Damrosch program for that day. The dentist had told an assistant to tune in; and it was the first pleasurable hour, so the woman wrote, that she had ever experienced in such surroundings.

"When I began this work," said Dr. Damrosch, "I never once supposed I would become a successful dentist's assistant."

This is hardly more engaging than a report from Germany that American pictures have been found there to deter crime. The State Councilor of the Bavarian Government is authority for the statement that psychological tests had established the beneficial effect of the formula plot our producers and exhibitors prefer, wherein virtue is always rewarded and vice severely punished. This will be accepted by many with a grain of salt; the Bavarian's theory regarding certain emotional effects is more to the point.

"If this invention had not come at this time," he said, "and had not been developed with the competency American producers brought to its perfection, the routine of modern industrial life would have pent up emotions and tensed human nerves until there might well have come an explosion volcanic enough to disrupt society."

VI

Dr. Damrosch, in his enthusiasm, enlisted the assistance of radio engineers in an effort to make more practicable the broadcasting of orchestra concerts. Thus the series of microphones, until then necessary to transmit the various tones of the instruments, was eliminated. In a single delicate device the engineers found a way to put upon the air all the volumes and tone qualities of the group, and Dr. Damrosch coöperated by rearranging his musicians so as to obtain the right relation between their instruments and one another, as well as with the transmitter. The technical difficulties in the way became negligible; the audience greatly increased, especially among children, for whom special programs were arranged. During Dr. Damrosch's first season it was estimated that three million youngsters listened to him; soon the number was said to have reached five millions. A questionnaire was prepared, and the manual distributed through the sixty broadcasting stations linked up for these occasions. They became an avenue of instruction as well as of entertainment. Many schools and colleges obtained radio equipment especially on this account, and Dr. Damrosch perceived that, ignoring the smiles of other and more conservative musicians, he was contributing to the cultural development of the nation. "I cannot conceive of a more beautiful mission for an artist to fulfill," he said.

The nuisance of the loud speaker, disturbing whole neighborhoods, remained, although legal steps were taken to mitigate it; and programs at once cheap, flashy and trashy continued to predominate for the benefit of that vast majority which is not interested in questionnaires or manuals of instructions. Manufacturers of storage batteries, cosmetics, safety razors, whatnot, continued to spend huge sums for time "on the air," in order to beguile millions invisible to them to listen to their announcements, although by a movement of the hand any one of these millions, when the program was completed, could shut out the advertising. But meanwhile the music of a whole continent, sometimes of the whole world, became available in isolated farmhouses, in hotel rooms occupied by lonely travelers, in crowded tenements and slums, and in millions of homes. The magic of the machine endowed with ubiquity the persons standing in sound-proof rooms before a tiny transmitter. Through ethereal channels was spread an acquaintance, fragmentary but civilizing, of distant climes and scenes and customs.

VII

American motion pictures, in the beginning afflicted with fakery, bombast, and hokum, were dubbed "the roughneck of the arts" by Terry Ramsaye, author of *A Million and One Nights: A History of the Motion Picture.* It was estimated that at least nine million persons must pay to see some of the costly early spectacles, if the producer was to reap any profit. The consequence was a preoccupation with simple themes, surface emotions and an obvious appeal to primitive hungers. Thrills were believed to be best sellers. Yet we must not suppose that a fondness for thrills is peculiar to the Machine Age. One of Jane Austen's characters told another the names of some delectable books she had listed for her friend: *Castle of Wolfenbach*, *Clermont*, *Mysterious Warnings*, *Necromancer of the Black Forest*, *Midnight Bell*, *Orphan of the Rhine*, and *Horrid Mysteries.*

"But are they all horrid?" asked her friend. "Are you sure they are all horrid?"

"Yes, quite sure; for a particular friend of mine, a Miss Andrews, a sweet girl, one of the sweetest creatures in the world, has read every one of them."

Necromancers and horrid mysteries do not suffice for the modern audience, certainly not for the motion picture audience. Thrills are desired, but—unlike *Dracula*, successful on the legitimate stage—thrills of a different sort. Cowboys, romantic heroes and incredible heroines, melodrama, slapstick comedy and feverish pursuits have been stirred again and again into a sort of medley for the mediocre. Nevertheless there has been apparent for some time an increasing slant toward greater consideration for news events, science, travel, and exploration; and, as we have seen, the new instrument was widely adapted to educational uses.

VIII

Hardly had we accustomed ourselves to the tricks the motion picture plays with time and space, compressing years into minutes at its pleasure, and leaping instantly from continent to continent, before the long-sought combination of sound and picture was accomplished. At first, to be sure, the product was even less satisfactory than the silent screen, but mechanical improvements overcame some of its worst shortcomings. That the talking picture has now arrived, and is here to stay, even though it is still a long distance from the achievements possible, no one can dispute. It has practically done away with the orchestra accompaniment, and almost straightway threw five thousand musicians out of employment. It turned Hollywood topsy-turvy, because few motion picture stars could enunciate for dramatic purposes, or knew how to speak their parts. They had risen in their field because of good looks and because they "screened well." Some began trying to learn the art of stage speech, but the more important development was that greater numbers of actors and actresses from the "legitimate" theater were drawn into the picture studios. Instantly an improvement in the quality of personnel was apparent.

Three mechanical methods were used at the outset by different producers. In one the voice was recorded on a wax disc which was synchronized with the moving pictures; in another the voice was recorded around the rim of the picture itself; in the third a double film was used, one to record the voice and the other the pictures, and the two to be synchronized in exhibition. The real problem of the "talkie," as this is written, is to reconcile two techniques, to keep the pictures moving while the voices are being heard. The first impulsive movement was toward subordinating the picturization to the phonographic phase. The motion picture, however, is still a greater marvel to us than the phonograph, and the audiences fond of this infant prodigy resented the slight thus put upon it. This feeling was mitigated by the successful presentation of musical comedies, reviews and vaudeville, in which dancing and music were the main constituents. It may be a long while before serious drama will be successfully produced, but the obstacles in the way seem certain to be overcome. At least we may be sure that the "talkie" will never commit, for example, such an atrocity as the silent pictures committed in their adaptation of Kipling's "Without Benefit of Clergy."

IX

In setting up false, often meretricious, standards of behavior, of luxury, of feeling and of thought, the motion picture has done even more than the radio broadcast to damage American life. Yet both of them have served as a means of filling hours set free by the machine—hours which their devotees have not learned as yet to devote to the enriching possibilities of real leisure. Upon one of the principal streets of Detroit, at dusk, I have noted the manner in which hundreds of the young men employed in automotive plants, each with his automobile and well-lined pockets, prepared to while away their evenings, idling and searching cynically the faces and figures of a passing procession of women. Unused time can be put to worse employment than the radio, the "movie" or the "talkie" offers. And it is quite possible that these mechanical agencies of diversion, even while exploiting superficial passions, do serve to some extent as a safety valve. Who shall say that, either outdoors or indoors, our amusements are on a lower level than the bleak silences of the Puritans, the carousals of the Cavaliers, or the stealthy pleasure-seeking of the Victorians?

CHAPTER NINETEEN

Conclusion

I

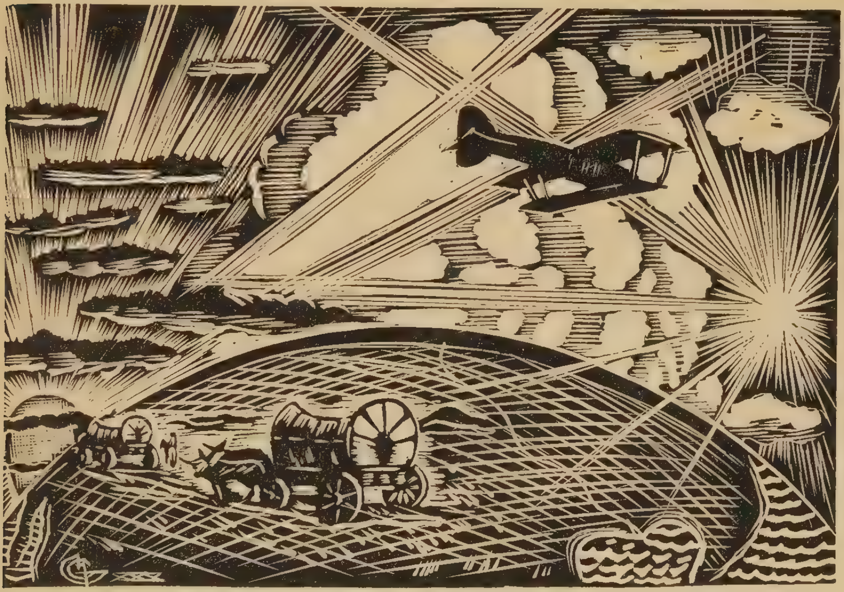
Ezra Meeker was a living link between pioneer America and the Machine Age. In his adventurous young manhood he went West in a covered wagon, and repeated the journey time and again; four years before his death, at the age of ninety-seven, he flew East in an airplane, like a modern Phœnix. It so happened that he was born just when the bannerets of mechanized industry were beginning to flutter along our eastern seaboard, and his existence spanned the development of automatic manufacture until it constituted the chief wonder of the modern world.

Although the colonial settlements in this country were business enterprises for the most part, and even those which had back of them primarily a religious motive presented distinct economic phases, an agricultural polity, as we have noted, was dominant until the middle 'thirties of the Nineteenth Century. Until the turn of that century the winning of the West went along concurrently with the conquests of science, technology and invention. When the nonagenarian frontiersman winged his way over the Rockies, over deserts and prairies, over the opulent Mississippi Valley, the Appalachians and the Jersey flats, his hardihood won the acclaim of a continent, for even then, in 1924, flying was regarded as hazardous. But to a man of his heart and temper, who had braved the hardships and perils of unbeaten trails, the journey, however amazing his chariot, could have held few terrors. He was of too stern a stuff to tremble, even in his middle nineties.

It was just as possible for Ezra Meeker to live dangerously in the second quarter of the Twentieth Century as in the middle of the Nineteenth. The automobile and the gangster were potential of death as sudden as from the Indian's arrow or tomahawk. William James, observing structural steel workers in the skeleton of a skyscraper, was moved to observe that the spice of danger was a necessary part of human existence. Curiously, it is, although one of man's primary wants is security of self and property. Once I asked a taxicab driver, as he came near collision in the crowded street, whether the danger of his occupation was what made him enjoy it. "This cab don't mean danger to me," he replied; "it means security. It means security for my wife and kids. If I didn't have this machine I couldn't earn a living, maybe, for them." It is possible, nevertheless, that the daily risk, and the exercise of skill in averting accidents, added zest to his work. Certainly the Machine Age has deprived our days of no spice in that regard. Those who love the thrill of peril have but to seek and find.

The real distinction between the life Ezra Meeker saw in his youth and the life of his declining years was in the element of hardship. The bones which whitened along the Oregon Trail were as often memorials of disease and exposure as triumphs of the redskins who owned that land. In a day of marked therapeutic achievement, of lowered mortality rates in childbirth and infancy, of the banishment of most epidemics, until life has been "prolonged," as the saying goes, by increasing the average expectation of life; in a day of steam heat, elevators and automatic devices to obviate drudgery, we are prone to forget the rigors and discomforts of existence prior to the Machine Age. Undoubtedly hardships toughened the physical fiber of our forefathers; also, they shortened lives. And if it be maintained that we have now no such tests of endurance as the settlers of this country withstood, the reply may be that such tests are not necessarily beneficial. We have our ludicrous pole-sitters and Marathon dancers; we have also men of steel who, in airplanes refueled from other machines, remain aloft for days in a pitiless contest of their stamina and nerve against the durability and efficiency of their engines. Here, indeed, is exemplified the supreme duel between what Jack London called the "abysmal brute" in man and the unwearying energy of the machine.

Ezra Meeker flew in twenty-four hours over the route that had taken six months in 1852, when first he boarded a prairie schooner. He knew what it meant to telescope time and reduce space to the vanishing point. He knew, as we cannot know, the difference between the present and the past, and he had nothing to say of "the good old days." He was an ancient and not very articulate; surely that phrase would have come first to his lips had it come into his mind.



II

Charts and tables prepared by an economist of standing show, what Ezra Meeker could scarcely have believed, that the people of the United States do as much productive work as the whole populations of fourteen other leading countries. These fourteen, with ten times as many people, do only as much work, according to this estimate. Africa and South America, it is true, were left out of the computations, and certain of our South American neighbors do their share in production. But the average worker in this country is held to do half as much again as the Canadian, who does even more than the Britisher. Our per capita productivity is two and one-half times as great as Germany's, ten times Russia's, twenty-five times India's, thirty times China's.

To this consummation, whether or not it is devoutly to be wished, the machine has been the chief contributor. Another factor has been our immense natural resources, another our climate, another the incentive of opportunity for all. Each of us has a company of automatic slaves at his command, and each worker is assisted by more than two horsepower. Charles P. Steinmetz asserted, before his death, that electricity would become so cheap in time as to make meters valueless, and that no one need work more than two hundred four-hour days each year. Even now it is asserted gravely that electricity performs in all some twenty-five thousand tasks for us.

A little staggering, this statement about the twenty-five thousand tasks performed for us by electricity; and it was made during the celebration of the fiftieth anniversary of Mr. Edison's inventing the electric light. Nicola Tesla disputes, perhaps unjustly, Mr. Edison's primacy in this field; but, however rightful the basis of the celebration, it was press-agented by expert and high-priced men, who may have permitted their enthusiasm to run a little away from them in calculating the near omnicompetence of electricity. We see something of the same sort, now and then, in glowing articles about "the age of superpower." Energy as "fluid as water," we are told (although it is a little difficult to conceive of electric energy in the bulky terms of water), is about to decentralize industry and depopulate our congested cities. It is true that the tide of labor is turning back from the cities to the land, and that automatic machinery is chiefly responsible for the change, but most of this machinery is operated now by steam, not by current shot from huge central generating stations.

Any one familiar with the propaganda methods of Samuel Insull and his satellites in the "power trust" will suspect that his ballyhoo of the dynamo is of interested origin. These writers say some hard things, for example, about steam and coal. If they denounced coal operators they might win readier concurrence than when they assert that only 117 pounds out of 2,000 actually mined are utilized. We are assured that 600 pounds are lost in the mines, 95 on the way to the boiler-room, 446 from wasteful engines and furnaces, and so on; and that locomotives burn about one-third as much coal as they move from mine to yard. We throw away, it is sorrowfully said, a billion dollars a year in poor mining, improper use of coal in factories and mills, and its consumption in locomotives. What is the answer? Where lies our salvation? In electricity from the "power trust," of course! The era "has dawned"; it is "a second industrial revolution which promises to be as far-reaching"—to quote one of its prophets—"in its social and economic effects as was the first."

Let us cannily consider the facts. They are readily procurable from the reports of the Federal Power Commission, which the barkers of the "power trust" side-show appear to have ignored. Thus we find that in ten years the production of electric power has more than doubled in this country, but that even so it constitutes only about one-third of the energy we use; and that in recent years the ratio of increase has varied from hydroelectric to steam energy, in a sort of nip-and-tuck battle to see which shall show the greater gain. The commission states officially that it is unable to perceive any definite trend in either direction. To its members the "dawn" of the ballyhoo literature remains invisible, and nothing is said about a second revolution.

In 1929 the output of electric power was severely reduced, owing to droughts, and the report tells us that "remarkable improvements in the efficiency of steam plants" within the preceding few years have greatly narrowed the margin of advantage in economy formerly enjoyed by waterpower. What, then, becomes of that wasted billion dollars over which the public utilities minnesingers were weeping? Efficiency in making steam should reduce that formidable figure, one would suppose. The commission asserts sadly that hydroelectric development does not get enough "public encouragement." Is this the nigger in the woodpile of the "power trust" propaganda?

As a further fact, not noted either by the commission or Mr. Insull's press agents, the steam plant of to-day has reduced its consumption of coal per unit of power in ten years from 3.20 pounds to 1.83. This is the average over the whole country; many plants show a much higher gain in efficiency. The authority for this statement is the United States Geological survey. The saving amounts to 5 per cent. of the annual coal consumption—5 per cent. of that billion on this single item! And the bureau assures us that there is now in sight enough coal to last us many centuries. The decade from 1920 to 1930 showed an increase in hydroelectric energy of less than six million horsepower, whereas the increase in steam energy during the same period was more than thirteen million horsepower.

Statements by protagonists of the power interests and of the public utilities in general, including radio corporations, may well be regarded by the American public with a deal of skepticism. Probably the officials of these corporations would rejoice to see in this country somewhat the same attitude as prevails in Russia, where electrification is all but deified. The farm tractor is regarded by simple peasants as a supernatural phenomenon, and there is an apotheosis of all such machines not less remarkable than the apotheosis of Lenin, who was first to use these devices as oratorical symbols whereby to stimulate and inflame the imagination of his countrymen.

III

If, as Steinmetz forecasts (and Steinmetz was no corporation's propagandist), we are to arrive at an average of two hundred working days annually, even though we reduce the labor to four hours daily, what are we to do with the hours set free?

Unoccupied time is not leisure, nor is speeding from point to point by automobile or airplane, nor is organized play, which seems to be Mr. Hoover's ideal. In the first chapter I spoke of that lack of inner resources which handicaps the people of this country from enjoying the full fruits of their idle time; for leisure does not consist of stereotyped pleasures, mechanized play, "spectatoritis," nor servile mingling with an idle herd. Leisure is enjoyed when we do something by individual choice and not by coercion, and when the doing brings a sense of timelessness and of enrichment. Leisure, to be worth the name, must be pleasurable, vivid, and tranquil. I fancy that those whose work is what they would most prefer to do have moments of leisure when they are busiest. Artists and creative writers doubtless pass minutes which have somewhat the quality of eternity, even when they are engaged with the tools of their arts.

There is a school of thought which attributes to Puritan tradition our inability to take advantage of the hours released to us by the machine. We have no "leisure class," some of our publicists tell us, because of the Puritan ideal of hard work and a fourteen-hour day. It is surprising to note how much importance is attributed to New England as shaping the mores and the destinies of this people. I have actually found, in books purporting to be histories, statements that the landing of the Pilgrims at Plymouth Rock was the first lasting settlement on these shores. That, obviously, must be set down either to effrontery or sheer ignorance; Jamestown, Virginia, was settled thirteen years earlier. The Cavaliers, one of whom wrote the Declaration of Independence, dominated the politics and customs of this country for fully half a century after the Declaration was written. Have we forgotten altogether the "Virginia Dynasty"? Have we forgotten that it was broken by Andrew Jackson, himself of Cavalier blood? Washington and Jefferson and Madison were Virginians, congenitally opposed to all the Puritans stood for; and a moment's reflection must convince us that they and their fellows did more to shape the political and cultural life of this people than all the Adamses and Lowells and Cabots.

The Puritan strain, thin to begin with, has been attenuated now to homeopathic proportions. But it is easy to see how dissenters and critics have found in the Puritan figure one which was vulnerable and easy to dislike, a ready mark for satire, venom and contempt. New England has been publicized as industriously as the Palisades of the Hudson, but in the opposite direction. Visitors from France and England express amazement when they note among our people traits which they have been told are contrary to Puritanism. "If we wish to understand the real sources of American inspiration," says André Siegfried, "we must go back to the English Puritanism of the Seventeenth Century." And Aldous Huxley ejaculates that what the traveler "discovers, to his vast surprise, if he happens to have arrived with the conventional opinions about the country, is that a Rabelaisian looseness is just as characteristic of contemporary America as Puritanical strictness. . . . Not less remarkable than the spectacle offered by American Puritanism and its opposites is that presented by American religion."

Now, if we dismiss as irrelevant, incompetent, and immaterial the popular notion that New England was the cradle of American liberties and the divinity which shaped our ends, we begin to perceive that many of the national shortcomings in deportment, legislative "reforms" and ways of thinking, commonly attributed to the Machine Age or to the Puritans, have an ethnic origin far antedating either of them.

IV

Our mania for speed, for example, is usually attributed to the machine, which has made possible speeds unthought of in an earlier civilization, save in myths and legends of magic carpets and seven-league boots. Even John Dewey, who, whatever his disquietude at manifestations of mass thinking, is not to be classed with the anvil chorus of protestants against our civilization, tells us that "the prevailing American ideal seems to be, 'Put it over and make it snappy while you do it.'" He says some of us are as much in a hurry for reforms as others are to attain speed in space. Doubtless Ezra Meeker, contrasting his twenty-four-hour flight with the six-month journey required three-quarters of a century ago to traverse the same distance, thought that speed was peculiar to the Machine Age.

"Tempo" has come into vast popularity in consequence of this notion. It has entered the vocabulary even of Mr. Hoover's Committee on Recent Economic Changes, which assures us solemnly that it is not economic law which has changed, but the tempo of industry and commerce. In my boyhood the rate of a mile a minute was regarded as miraculous, but now we have trains which travel faster, speed boats which travel half as fast again, automobiles which move nearly four times as rapidly, and airplanes nearly six times. Against the achievement of higher and higher speeds stand two factors: the increase in cost, owing to the fact that the resistance of air or water increases as the cube of the rate, so that while an engine of five hundred horsepower may make two hundred miles an hour, to make four hundred miles will require four thousand horsepower; and the temperamental inability of mankind to endure great speeds. Entomologists tell us of an insect which can travel at the rate of eight hundred and fifty miles an hour, but there is good reason to doubt whether a human being could endure such an ordeal.

Rapid locomotion is one of our time-saving agencies. Fast trains, subways, automobiles and airplanes increase the number of hours in which we might, if we would and could, discover the true uses of leisure. Yet there is no denying, nor is there any intention here of minimizing, the effect of modern speed on our nerves and habits. Many persons find intense exhilaration in driving high-powered cars at dizzy speed, but they suffer an inevitable reaction; and even those who do not enjoy such sports find that the mere spectacle of speed reacts unfavorably on them. Most of us are restless and discontented in part because of the rush and urge of the life around us. It is contagious, this sense of hurry; we find ourselves impatient and provoked when halted by a traffic signal, even though we have plenty of time to reach our goal or to do whatever we may be doing. We become victims of mass movement, and our nervous systems suffer correspondingly.

But why do the quasi-Freudian Jeremiahs who dwell so insistently on this point ignore the fact that speed was of primary importance to primitive man? Fleetness of foot often meant life to him, sluggishness death before some primeval beast. Our predilection for rapid motion is an unconscious and inherited passion, common to us all and going back of recorded history. We damn the machine for a craving inherited from our remotest ancestors, and persistently maintained through generation after generation, all of which found that speed was indeed of vital importance. There is nothing peculiar to our time in it; our ingenuity has merely afforded greater opportunity for its gratification, by accelerating its media. It is reasonable to suppose that a foot race with Pterosauria was more nerve-racking than the commuter's sprint to catch his train on the fly.

A great deal is being said about the noise of the Machine Age as hurtful to nerves. To it jazz has been attributed. A psychiatrist has even asserted that irritation from this source is the most frequent cause of divorce. Urban clatter and din is too persistent and too annoying to be belittled, and I have found occasion in this book to speak of it more than once; but there is this comforting reflection, that it can be remedied, and that in many offices it is now being insulated and diminished by other devices. Electric welding can be substituted for the pneumatic riveter on the skyscraper skeleton, and the jostling of carts over cobblestones will cease as fast as antiquated cobblestones and carts enter the limbo where they belong. Legislators, health authorities, and employers are planning ways of muffling or absorbing the shrill, the clamant, the explosive sounds which assail the city dweller. Advertisers are helping to make the public aware of its rights and the dangers which assail it from this direction. "Only quiet," one of them shouts, "can produce the things that genius gives to the world." Business should be "quietized"—a word as disturbing as any sudden and unexpected sound. "A silent roller bearing makes a difference," one railroad announces soothingly. An ocean liner is put before the world as having "sound-proof rooms." Long before these sayings were broadcast by the score, the millionaire owner of a New York newspaper, now dead, spent a good deal of money to have built into his home a quite silent room.

General William L. Sibert, who has lived in camps and cities in nearly every part of the habitable globe, bought a farm, after he retired from the army, near Bowling Green, Kentucky. When I asked him why he had selected that place, when he might have put to the test, had he so chosen, the boasts of California realtors, or might have preferred the French Riviera, I half expected him to say that he was in search of quiet. But no: "I came here," he drawled, "because I don't know of any other place where it is so easy, if a man wants to go hunting or fishing, to find other men who will quit whatever they are doing and go along."

Here, then, was both quiet and real leisure. But neither noise nor hurry is characteristic of this age to the exclusion of all other times. Matthew Arnold sang of "this strange disease of modern life, with its sick hurry"; Shakespeare spoke of "life's fitful fever," and Montaigne, who died considerably more than three centuries ago, advised us to reserve for ourselves a sort of back-shop, our very own and "all free," as a retreat and place of solitude. Perhaps the publisher of whom I have spoken had in mind some such spot. Those harassed by the machine might find in a similar sanctuary refuge from the faults they are wont to bewail.

V

Women, I have said elsewhere in this volume, are more directly affected by the Machine Age than are men. They spend more than four-fifths of the money disbursed in this country at retail, and are subjected to a greater extent to the influences of mass production and standardized commodities. They are more suggestible, according to psychologists; two-thirds of our advertising is directed primarily to their eyes. Automobiles, for example, are described as meritorious because of their upholstering, pleasing lines, and ease of steering. Women not merely drive their own machines, whereas few women drove carriages, but they are doing many other things their grandmothers did not do or had no opportunity to do, while Mere Man is chained to an old routine. Women now take part in political, financial, commercial, artistic, sociological and professional activities until recently closed to them or entered by them in small numbers.

They are affected, further, by economic conditions which militate against early marriage and large families. Many young couples, obviously, cannot afford to marry unless both of them continue, at least for a time, to work; and there is no doubt that higher education, opening the possibility of a career, leads many of the sex to think indifferently of marriage and home life. An official of the New York State Department of Labor has told about a friend of hers whose father gave her, as a wedding present, $25,000. A newspaper reporter asked whether she intended to put the money into a home.

"Home," she exclaimed. "Twenty-five thousand dollars for a home? I was born in a hospital, I was brought up in a nursery, I was educated in a college, I am going to be married in a church, I will live in a hotel, and when I die I will be buried from a funeral parlor. Why in the world put all this money into a home?"

This was told in connection with the statement that many women, because modern devices have greatly lightened their domestic duties, hold part-time places in factories, and save their earnings, not to improve their dwellings but to pay off installments on the automobile. But the example chosen, although a college-bred young woman, did not represent a majority of that group, since she was about to marry. A questionnaire sent to seventeen hundred college girls and graduates revealed that only seven were looking forward to marriage and motherhood. This, as so often happens in the questionnaire method of gathering information, was misleading; for as a fact about 50 per cent. of women college graduates do marry, and in the aggregate they average a little more than one child each. The dwindling birth rate in this country is due chiefly to the so-called "upper" classes, while those less blessed with worldly goods continue as prolific as ever. C. E. M. Joad, an English publicist, deduces from these and related facts that we are to evolve a new morality from the Machine Age. His notion of what is to come would shock the Puritan conscience, if it were as prevalent in this United States as some would have us believe; in truth, it is as likely to be fulfilled here as in England, which he had specially in mind.

While women were glimpsing these new horizons, the domestic scene was being altered by the machine. For the most part the alterations meant a saving of time, even as the machine released the worker elsewhere from long hours. The question of fruitful leisure is as pertinent in the woman's case as in any man's, and a casual inspection indicates that she has come nearer answering the question successfully than have men. Whether she has profited, by and large, from the conveniences and opportunities of this civilization, is for her to say. I doubt whether she would care to return to the hoop skirt and the spinning wheel.

VI

Civilization is a word so loosely used that it means all things to all men. Burke thought it depended on the spirit of a gentleman and the spirit of religion; the Eighteenth Century gentleman is obsolete, and modern science is at war with the religious concepts Burke had in mind. Although this conflict between technology and Fundamentalism is a cause of orthodox complaint, and has been since the day of the astrologer and the alchemist—who were not technologists, of course—I doubt whether any one would assert that the mere absence of measurement, method and reason—that is, the absence of technique—would enhance any civilization. Our interest in scientific matters, in fact, is one of the hopeful aspects of the present day, and surely will serve to encourage that habit of mind which is hostile to standardization and mass thinking. Technology should liberate the individual; the free play of individualism appears to be the goal of those bitterest against the Machine Age.

Guizot, a contemporary of Burke, thought that civilization depended on social well-being and happiness, with the development of the individual human mind and its faculties; the progress of society and the progress of its members, the enlargement, quickening and improvement of exterior conditions, the energy and brilliance of man's intellectual nature, seemed to him the desirable ends of progress. The ideal of personal independence, aside from civil liberty, was introduced to European civilization, he reminds us, by the barbarians who overthrew Rome. It was they who demanded and enjoyed the full exercise of their powers through all ups and downs, who were fond of "activity without labor," who sought a life of enterprise and adventure. Conceding that there was an alloy of "brutal and stupid selfishness" in this, Guizot yet perceived in it "something of a noble and moral character." These barbarians were pagans; and Sainte-Beuve exalted the paganism which consists of freedom of thought and action. The longing for uninhibited "self-expression," indeed, is as old as man's first attempts to organize communities, for such organization meant the limitation of certain individual liberties. Metaphysically it expressed itself in a conflict between free will and predestination; psychologically it may be said now to express itself in a conflict between the philosophy of Bergson and the beliefs of behaviorists. It is not by any means an outcropping of the Machine Age; it is an ancient of ancients. And if we are told that within the last century or so there has been greater individualism in European society, or even in our own, we may well inquire whether this was confined to a favored few, to the exclusion of the masses.

At a glance it is apparent, of course, that the machine is opposed to individuality. It is ruthless, routine, patterned and precise. It has no use for many of the qualities and attributes of man, who created it. It has no way to employ that enthusiasm and effervescent imagination which were the well-springs of its invention. Biology gave to the world a creature who brought forth mechanized industry, and who then complained that his richest capacities were thrown before industry as pearls before swine. These are the capacities to be utilized in the enjoyment of a leisure which mechanized industry makes possible.

VII

And these capacities are being enlarged through beneficences made possible by machine-born wealth. The annual gross income of the population of the United States is as great as the total wealth of England, Ireland, Scotland and Wales, we are told, and in the same breath we hear the complaint that it is inequitably distributed, so that the mass has not a decent living wage, while the few monopolize incomes mounting to millions of dollars. This is true in the main, but takes no account of an indirect distribution through the whole people; the modern gospel of the wealthy made it seem to Andrew Carnegie disgraceful to die rich, and prompted personal and private gifts in 1928 aggregating more than a billion dollars for educational, artistic, religious, charitable and recreational purposes. Public expenditures that year were close to three billions in these fields. Scores of huge foundations make war against disease, illiteracy, and other social evils, for the benefit of all. Often these agencies seek to cure or offset maladies and maladjustments due to the very machine that begot the agencies.

Our control of natural resources and natural forces, as well as our intellectual resources, transcend those of Athens, Rome, or all Europe during the Renaissance. Our servility to material aggrandizement arises from our living in a society founded on capital and motivated by profits. Yet private gain goes in part at least to community betterment, and corporate gain goes in part to providing safeguards against personal and public disaster. We are still fumbling in the effort to curb and control the Mississippi River in its seasonal turbulences, but railroads spend more than forty million dollars a year to increase the security of that form of transportation, and it is safer now, according to trustworthy statistics, than sitting at home. It may be that we are robbed of billions at the points of guns and swindled out of more billions by "blue sky" promoters; governments local, State and Federal, as well as honest corporations, spend millions to protect us from these losses. The American Telephone and Telegraph Company spends in a single year half as much again as the Panama Canal cost, in order that we may be in close touch one with another for the communication, to be sure, of good tidings, but also for protection in time of danger, disease, or other difficulty. Industrial ill-health and accidents are being reduced, and we have scores of mechanical means of reclamation and restoration. Technology and the machine resurrected San Francisco while Pompeii still slept in her ashes.

VIII

Thus we find, it seems to me, that items in the debit column against the machine are being diminished or erased. Gerald Heard, in *The Ascent of Humanity*, asserts that the notion of progress first became clearly conscious in men's minds in the Seventeenth Century. The foundations of the Machine Age, in the effort to build a rational structure of the world around us, had been laid centuries earlier, but the application of automatic power to machinery did not come until a century later. However one may define progress, in its material and mental aspects, no one can deny, I take it, our advance since the Seventeenth Century. As for religion, the Inquisition was not abolished until the beginning of the Nineteenth Century, and our Colonials put "witches" to death.

An examination of what the machine has done to us and for us, in such physical matters as food and clothes and shelter, in such institutional matters as warfare and education and politics and the daily press, in communication, transportation, commerce and labor, does not leave so bad a taste in the mouth as I, for one, anticipated. Many of us swing between an inclination to complain without sufficient cause and a tendency to be too easily satisfied. In the "intellectual" the Machine Age provokes the former mood, in its successful captain the latter mood. Neither of them, we may well believe, occupies an invulnerable position. Both of them shoot a little wide of the mark, if they are aiming at a dispassionate audit of our situation.

Lord Bryce, who saw clearly the shortcomings of the American commonwealth, as he called it, was still neither dispirited nor pessimistic at what he saw here. Our governmental experiment, which we have undertaken on a larger scale than can be found elsewhere, has been subjected by some critics in this country to severer indictments than the machine itself; and Émile Faguet, writing of the French Republic, called it "The Cult of Incompetence." At least we may say of the machine, whatever its faults, that it has engendered a cult of competence and efficiency. Whether we will master it in the end, or drift into servility to it, is still a matter of speculation. In speculative jargon, we are safer, I believe, on the bull side of the market.

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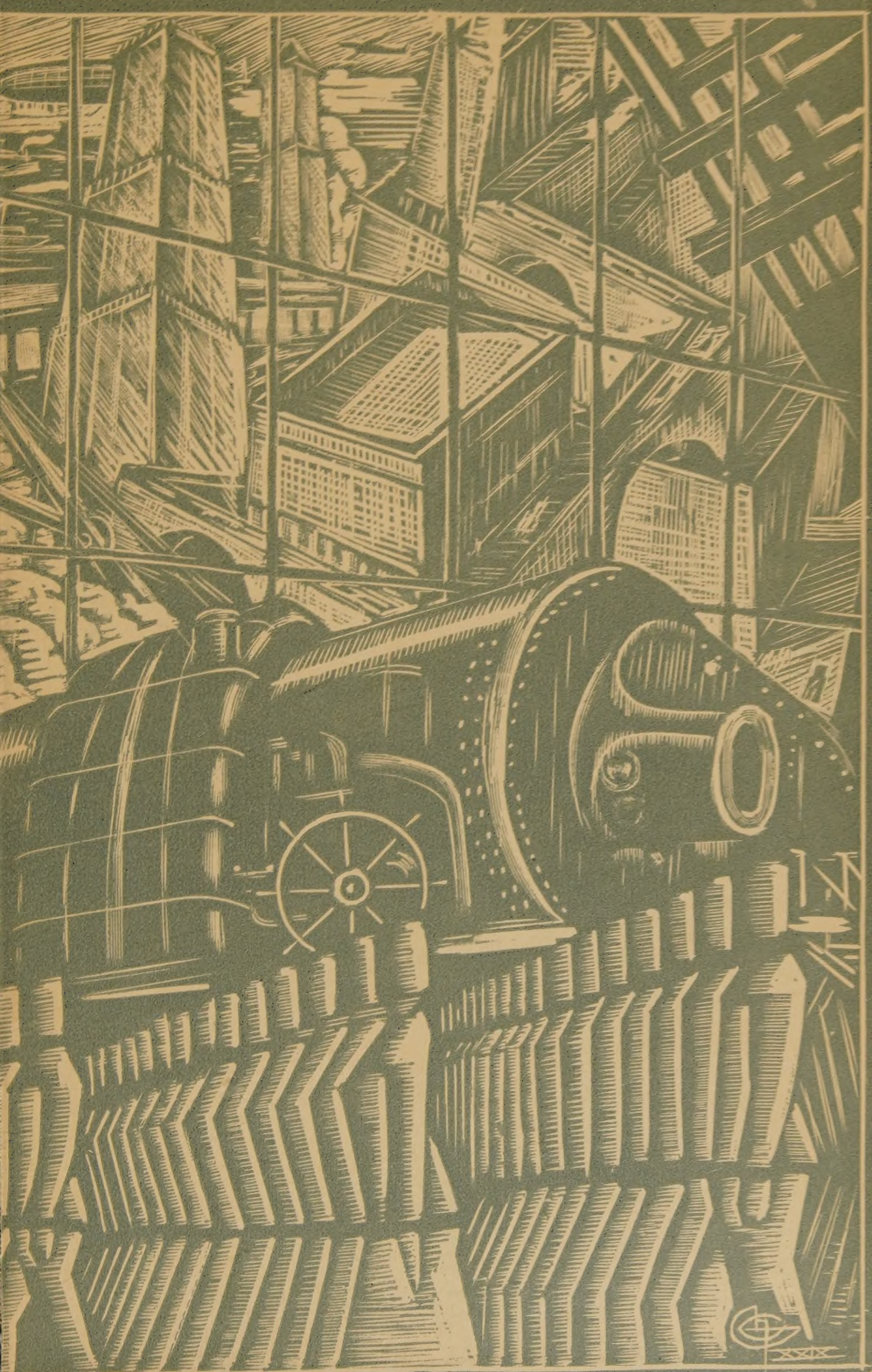
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